

1. Method and system for estimating wear of axially divided tread zones of tire

Date: 2018-06-26 | ID: 10005328

Abstract: A method for estimating wear of each of circumferential tread zones of a tire by the use of a computer is disclosed. A tire model of the tire comprising model's circumferential tread zones is defined. A simulation for running the tire model under rolling conditions for free-rolling, braking, driving and cornering is performed to obtain a first average wear energy of each model's circumferential tread zone under each rolling condition. With respect to a given running pattern of the tire, occurrence frequencies of the respective rolling conditions occurring in the running pattern are defined. For each circumferential tread zone, a second average wear energy of the concerned circumferential tread zone when the tire is run according to the running pattern is calculated such that the first average wear energies under the respective rolling conditions, of the model's circumferential tread zone of the concerned circumferential tread zone are respectively weighted by the occurrence frequencies of the respective rolling conditions. Wear of each circumferential tread zone is estimated based on the calculated second average wear energy of the concerned circumferential tread zone.

2. Photovoltaic device containing a dye-sensitized solar cell

Date: 2018-06-26 | ID: 10008335

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type portions in which at least one of an oxadiazole isomer acts as a -conjugated bridge (spacer), a biphenyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell and in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

3. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-06-26 | ID: 10008357

Abstract: Disclosed herein are a high-voltage generator for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target, and an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray

source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerised tomography. In particular, the high-voltage generator includes a shield electrode electrically connected intermediate of a first voltage multiplier and a second voltage multiplier. The electron beam apparatus includes control photodetectors and photo emitters having a transparent conductive shield arranged therebetween. The rotary vacuum seal includes a pumpable chamber at a position intermediate between high-pressure and low-pressure ends of a bore for a rotating shaft. The rotary target assembly is configured such that when a torque between a bearing housing and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target has a plurality of target plates supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

4. Solar cells with enhanced solar capture

Date: 2018-07-03 | ID: 10014121

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type molecules in which at least one of an oxadiazole group acts as a -conjugated bridge (spacer), a naphthyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell. The dye for use in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

5. Radiation sensor device for high energy photons

Date: 2018-07-03 | ID: 10014165

Abstract: A radiation sensor device is disclosed for use with a radiation source, capable of emitting radiation with photon energies larger than the work function of the target comprising a target plate to be impacted by the radiation to generate photo-electrons, the target plate being electrically isolated from a shielding electrode. The shielding electrode is arranged to collect energy-filtered photo-electrons from the target plate, using an electrostatic barrier for the filtering. The target plate is constructed of a carbon material. A current measurement device is operative to keep the target plate at a preset voltage difference with respect to the shielding electrode and measure a photo-electron deficit current as a result of radiation impact on the target

plate.

6. Inexpensive variable rep-rate source for high-energy, ultrafast lasers

Date: 2018-07-03 | ID: 10014645

Abstract: System for converting relatively long pulses from rep-rate variable ultrafast optical sources to shorter, high-energy pulses suitable for sources in high-energy ultrafast lasers. Fibers with positive group velocity dispersion (GVD) and self phase modulation are advantageously employed with the optical sources. These systems take advantage of the need for higher pulse energies at lower repetition rates so that such sources can be cost effective.

7. De-ghosting of images captured using a capsule camera

Date: 2018-07-03 | ID: 10015372

Abstract: A method of reducing ghost in images captured using a capsule endoscope while travelling in the gastrointestinal (GI) tract. The captured images contain ghost caused by reflections of multiple light sources by capsule housing of the capsule endoscope. The method derive, from the plurality of images, a ghost model comprising multiple ghost coefficients for relating light energies from the multiple light sources for a given image with ghost signals at multiple pixel locations for the given image. De-ghosted images are generated by compensating the plurality of images using estimated ghost signals based on derived ghost coefficients and the light energies from the multiple light sources. The process of deriving, from the plurality of images, the ghost model comprises removing any sensor gamma or any other non-linearity in pixel values of the plurality of images associated with the light energy.

8. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-07-10 | ID: 10020157

Abstract: Disclosed herein are a high-voltage generator for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target, and an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerized tomography. In particular, the high-voltage generator includes a shield electrode electrically connected intermediate of a first voltage multiplier and a second voltage multiplier. The electron beam apparatus includes control photodetectors and photo emitters having a transparent conductive shield arranged therebetween. The rotary vacuum seal includes a pumpable chamber at a position intermediate between high-pressure and low-pressure ends of a bore for a rotating shaft. The

rotary target assembly is configured such that when a torque between a bearing housing and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target has a plurality of target plates supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

9. Simulation systems and methods

Date: 2018-07-17 | ID: 10025892

Abstract: Methods, systems, computer-readable media, and apparatuses for performing, providing, managing, executing, and/or running a spatially-optimized simulation are presented. In one or more embodiments, the spatially-optimized simulation may comprise a plurality of worker modules performing the simulation, a plurality of entities being simulated among the plurality of worker modules, a plurality of bridge modules facilitating communication between workers and an administrative layer including a plurality of chunk modules, at least one receptionist module, and at least one oracle module. The spatially-optimized simulation may be configured to provide a distributed, persistent, fault-tolerant and spatially-optimized simulation environment. In some embodiments, load balancing and fault tolerance may be performed using transfer scores and/or tensile energies determined among the candidates for transferring simulation entities among workers. In some embodiments, the plurality of bridge modules may expose an application programming interface (API) for communicating with the plurality of worker modules.

10. Method and apparatus to digitize pulse shapes from radiation detectors

Date: 2018-07-17 | ID: 10027340

Abstract: A field programmable gate array based multi-channel flash ADC unit combined with a high speed multi-lane data communications channel/Ethernet-like modular intercommunication providing a complete but easily expandable high-speed data acquisition system. This apparatus and method permits high-speed pulse-shape digitalization allowing position resolution imaging of particles having a range of energies and is scalable to achieve the efficient capture of coincident data from large electromagnetic detector arrays.

11. Method for measuring dosage by means of a radiation detector, especially an X-radiation or gamma-radiation detector, used in the spectroscopic mode, and dosage measurement system using said method

Date: 2018-07-24 | ID: 10031239

Abstract: A method for measuring dosage by means of a radiation detector, especially an X-radiation or gamma-radiation detector, used in the spectroscopic mode, and a dosage measurement system using said method. A range of energies and a dose type H is chosen, a radiation detector of a given type is used, spectra measured by the detector are established for various radiations of the given type, the energies of which are within the chosen range and the respective doses of which are known, and from the spectra, a weighting function is established, that is a correspondence between a mean dose increment and a mean energy, deposited into the detector. This enables a person provided with a dosimeter identical to the detector to know at any time the mean absorbed dose rate, expressed in the amount H.

12. Automatic grouping of document objects for reflowed layout

Date: 2018-07-24 | ID: 10031892

Abstract: A method for arranging graphical objects in an electronic document displayed on a screen of a computing device includes calculating a plurality of positions of the graphical objects displayed on a display area of the screen, grouping the graphical objects whose calculated positions are located within a predetermined area of the display area, calculating a reference point of the group based on each position of the grouped graphical objects, reflowing the grouped graphical objects in response to a variation in display of the electronic document, calculating potential energies for the reflowed graphical objects, and displaying the electronic document with the reflowed graphical objects in a layout having the minimum potential energy among the calculated potential energies.

13. Semiconductor optical element, semiconductor laser element, and method for manufacturing semiconductor optical element and semiconductor laser element, and method for manufacturing semiconductor laser module and semiconductor element

Date: 2018-07-24 | ID: 10033154

Abstract: A semiconductor optical element includes a semiconductor layer portion that includes an optical waveguide layer. The semiconductor layer portion contains a first impurity having a function of suppressing atomic vacancy diffusion and a second impurity having a function of promoting atomic vacancy diffusion, between a topmost surface of the semiconductor layer portion and the optical waveguide layer. The semiconductor layer portion includes two or more regions that extend in a deposition direction. At least one of the two or more regions contains both the first impurity and the second impurity. The two or more regions have different degrees of disordering in the optical waveguide layer achieved through atomic vacancy diffusion and different band gap energies of the optical waveguide layer.

14. Systems and methods for providing an ion beam

Date: 2018-08-07 | ID: 10039935

Abstract: Systems for treating a patient using protons include a proton source configured to provide a proton beam having a plurality of proton energies and at least one processor. The at least one processor is configured to control relative movement between the proton beam and the patient in two dimensions, and to control the proton energy distribution to adjust the penetration depth of the protons in the third dimension while maintaining substantially fixed coordinates in the other two dimensions. Such treatment systems allow for shorter treatment times, higher patient throughput, more precise treatment of the desired areas, and less collateral damage to healthy tissue.

15. Human auditory system modeling with masking energy adaptation

Date: 2018-08-07 | ID: 10043527

Abstract: A method for generating a psychoacoustic model from an audio signal transforms a block of samples of an audio signal into a frequency spectrum comprising frequency components. From this frequency spectrum, it derives group masking energies. These group masking energies each correspond to a group of neighboring frequency components in the frequency spectrum. For a group of frequency components, the method allocates the group masking energy to the frequency components in the group in proportion to energy of the frequency components within the group to provide adapted mask energies for the frequency components within the group, the adapted mask energies providing masking thresholds for the psychoacoustic model of the audio signal.

16. Internally-heated thermal and externally-cool photovoltaic cascade solar energy system for full solar spectrum utilization

Date: 2018-08-07 | ID: 10043932

Abstract: A single-stack, solar power receiver comprising both a thermal absorber layer and a photovoltaic cell layer. The stack includes an aerogel layer, that is optically transparent and thermally insulating (OTTI); a spectrally selective high thermal conductivity (SSTC) thermal absorber layer; a bottom OTTI layer; and a PV cell layer. The SSTC layer includes a set of fins that substantially blocks solar radiation absorption in the band where PV cells are most sensitive. Photons with energies above or below this band block range are absorbed by the fins and the absorbed heat is conducted to pipes in the fin structure carrying a heated thermal working fluid to heat storage. Photons with energy in the band block range are reflected by the SSTC fins to the PV cell layer. The bottom OTTI aerogel layer keeps the PV cell operating near ambient temperature. The PV cell converts incident solar radiation to electrical energy.

17. Laser repetition rate multiplier and flat-top beam profile generators using mirrors and/or prisms

Date: 2018-08-07 | ID: 10044164

Abstract: A repetition rate (pulse) multiplier includes one or more beam splitters and prisms forming one or more ring cavities with different optical path lengths that delay parts of the energy of each pulse. A series of input laser pulses circulate in the ring cavities and part of the energy of each pulse leaves the system after traversing the shorter cavity path, while another part of the energy leaves the system after traversing the longer cavity path, and/or a combination of both cavity paths. By proper choice of the ring cavity optical path length, the repetition rate of an output series of laser pulses can be made to be a multiple of the input repetition rate. The relative energies of the output pulses can be controlled by choosing the transmission and reflection coefficients of the beam splitters. Some embodiments generate a time-averaged output beam profile that is substantially flat in one dimension.

18. System, apparatus and method for clean, multi-energy generation

Date: 2018-09-04 | ID: 10066556

Abstract: Systems, apparatuses and methods in interoperating with multiple clean energy sources, such as pneumatic energy, electrical energy, hydrogen energy and steam energy, with engine configurations employing these clean energy sources dynamically and synchronously. Further embodiments including fossil fuel energies.

19. Ion mass separation using RF extraction

Date: 2018-09-04 | ID: 10068758

Abstract: An apparatus which has the capability of filtering unwanted species from an extracted ion beam without the use of a mass analyzer magnet is disclosed. The apparatus includes an ion source having chamber walls that are biased by an RF voltage. The use of RF extraction causes ions to exit the ion source at different energies, where the energy of each ion species is related to its mass. The extracted ion beam can then be filtered using only electrostatic energy filters to eliminate the unwanted species. The electrostatic energy filter may act as a high pass filter, allowing ions having an energy above a certain threshold to reach the workpiece. Alternatively, the electrostatic energy filter may act as a low pass filter, allowing ions having an energy below a certain threshold to reach the workpiece. In another embodiment, the electrostatic energy filter operates as a bandpass filter.

20. Semiconductor optical element, semiconductor laser element, and method for

manufacturing semiconductor optical element and semiconductor laser element, and method for manufacturing semiconductor laser module and semiconductor element

Date: 2018-09-04 | ID: 10069280

Abstract: A semiconductor optical element includes a semiconductor layer portion that includes an optical waveguide layer. The semiconductor layer portion contains a first impurity having a function of suppressing atomic vacancy diffusion and a second impurity having a function of promoting atomic vacancy diffusion, between a topmost surface of the semiconductor layer portion and the optical waveguide layer. The semiconductor layer portion includes two or more regions that extend in a deposition direction with different contents of at least one of the impurities. At least one of the two or more regions contains both the first impurity and the second impurity. The two or more regions have different degrees of disordering in the optical waveguide layer achieved through atomic vacancy diffusion and different band gap energies of the optical waveguide layer.

21. Ophthalmic treatment apparatus and beam control method therefor

Date: 2018-09-25 | ID: 10080683

Abstract: The present invention relates to an ophthalmic treatment apparatus and to a beam control method therefor. The ophthalmic treatment apparatus according to the present invention comprises: a beam generating unit for generating beams having different pulse energies; a bubble sensing unit for sensing whether or not bubbles have been generated, as well as the amount of generated bubbles, on the basis of the pulse energy of the beam generated by the beam generating unit and radiated onto the treatment region of an eyeball; and a control unit for controlling the operation of the beam generating unit such that the pulse energy of the beam generated by the beam generating unit can be adjusted in accordance with the signal from the bubble sensing unit.

22. Ultra-responsive phase shifters for depletion mode silicon modulators

Date: 2018-09-25 | ID: 10082686

Abstract: A novel phase shifter design for carrier depletion based silicon modulators, based on an experimentally validated model, is described. It is believed that the heretofore neglected effect of incomplete ionization will have a significant impact on ultra-responsive phase shifters. A low VL product of 0.3 V·cm associated with a low propagation loss of 20 dB/cm is expected to be observed. The phase shifter is based on overlapping implantation steps, where the doses and energies are carefully chosen to utilize counter-doping to produce an S-shaped junction. This junction has a particularly attractive VL figure of merit, while simultaneously achieving attractively low capacitance and optical loss. This improvement will enable

significantly smaller Mach-Zehnder modulators to be constructed that nonetheless would have low drive voltages, with substantial decreases in insertion loss. The described fabrication process is of minimal complexity; in particular, no high-resolution lithographic step is required.

23. Systems and methods using optical amplifiers

Date: 2018-09-25 | ID: 10084283

Abstract: An optical system is described. The optical system has an optical amplifier array. The optical amplifier array has an array of optical amplifiers. Each optical amplifier has an optical amplifier region including a semiconductor active region having a direct electronic band gap with a conduction band edge. The semiconductor active region is embedded within a photonic crystal having an electromagnetic band gap having photon energies overlapping the energy of the conduction band edge of the electronic band gap such that spontaneous emission of photons in the semiconductor active region is suppressed.

24. Method for energy calibration of a pulsed cutting laser for eye surgery

Date: 2018-10-02 | ID: 10086470

Abstract: A method for energy calibration of a pulsed cutting laser for eye surgery comprises irradiating a sample material with a plurality of sets of laser pulses of the cutting laser with pulse energies differing from set to set. This method also comprises analyzing at least one visually perceptible discoloration structure created in the sample material as a result of the irradiation, selecting the pulse energy of one of the sets based on the analysis, and setting a treatment pulse energy for the cutting laser based on the selected energy.

25. Low dielectric constant (low-k) dielectric and method of forming the same

Date: 2018-10-02 | ID: 10090150

Abstract: A method of forming a low dielectric constant (low-k) dielectric is disclosed. The method includes providing a substrate and forming a dielectric including porogens over the substrate. While subjecting the dielectric to a first pressure, the dielectric is exposed to ultraviolet (UV) radiation. The dielectric is also subject to a second pressure less than 1×10^3 Torr. While subjecting the dielectric to the second pressure, the dielectric is exposed to vacuum UV (VUV) radiation having one or more photon energies greater than 7 eV. Since it is difficult for VUV radiation to travel through a medium at a pressure greater than 10 Torr without being absorbed by intermittent materials, subjecting the dielectric to the second pressure creates a medium wherein the dielectric can be exposed to the VUV radiation. By exposing the dielectric to UV and VUV radiation, the dielectric can achieve a reduced dielectric constant and increased mechanical properties.

26. Dose aspects of radiation therapy planning and treatment

Date: 2018-10-09 | ID: 10092774

Abstract: Radiation treatment planning includes accessing values of parameters such as a number of beams to be directed into sub-volumes in a target, beam directions, and beam energies. Information that specifies limits for the radiation treatment plan are accessed. The limits include a limit on irradiation time for each sub-volume outside the target. Other limits can include a limit on irradiation time for each sub-volume in the target, a limit on dose rate for each sub-volume in the target, and a limit on dose rate for each sub-volume outside the target. The values of the parameters are adjusted until the irradiation time for each sub-volume outside the target satisfies the maximum limit on irradiation time.

27. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-10-09 | ID: 10096446

Abstract: Disclosed herein are a high-voltage generator (120) for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target (500), and an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerized tomography. In particular, the high-voltage generator includes a shield electrode (123a, 123b) electrically connected intermediate of a first voltage multiplier (122a, 122b) and a second voltage multiplier (122b, 122c). The electron beam apparatus includes control photodetectors (202a, 202b not shown) and photo emitters (201a, 202a) having a transparent conductive shield (203a and 203b, 203c not shown) arranged therebetween. The rotary vacuum seal includes a pumpable chamber (302) at a position intermediate between high-pressure and low-pressure ends of a bore (301) for a rotating shaft (401). The rotary target assembly is configured such that when a torque between a bearing housing (403) and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target (500) has a plurality of target plates (560) supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode (123a) maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

28. All-fiber chirped pulse amplification systems

Date: 2018-10-09 | ID: 10096962

Abstract: By compensating polarization mode-dispersion as well chromatic dispersion in photonic crystal fiber

pulse compressors, high pulse energies can be obtained from all-fiber chirped pulse amplification systems. By inducing third-order dispersion in fiber amplifiers via self-phase modulation, the third-order chromatic dispersion from bulk grating pulse compressors can be compensated and the pulse quality of hybrid fiber/bulk chirped pulse amplification systems can be improved. Finally, by amplifying positively chirped pulses in negative dispersion fiber amplifiers, a low noise wavelength tunable seed source via anti-Stokes frequency shifting can be obtained.

29. Pulse slicer in laser systems

Date: 2018-10-09 | ID: 10096963

Abstract: An apparatus (such as a laser-based system) and method for providing optical pulses in a broad range of pulse widths and pulse energies uses a pulse slicer which is configured to slice a predefined portion having a desired pulse width of each of the one or more output optical pulses from a laser oscillator, in which timings of a rising edge and a falling edge of each sliced optical pulse relative to a time instance of a maximum of the corresponding each of the one or more output optical pulses from the laser oscillator, are chosen at least to maximize amplification efficiency of the optical amplifier, which may be located after the pulse slicer, and to provide the one or more amplified output optical pulses each having the desired pulse energy and pulse width.

30. Nano particle detection with X-ray capsule

Date: 2018-10-16 | ID: 10098599

Abstract: A colon imaging system, including an imaging capsule, having: a. a radiation source providing X-Ray and gamma radiation with energies sufficient to induce X-Ray fluorescence from nanoparticles that adhere to cancerous tissue, and which were administered to a patient in a solution prior to examining the colon with the imaging capsule; b. a detector for detecting particle energy of particles emitted responsive to the provided radiation and forming count information disclosing a number of particles detected for each energy level; c. a transceiver for transferring the count information to an external computer for analysis, and also having a computer for constructing images of an inside of the colon based on the count information; wherein the images provide an indication of locations in the colon of which the nanoparticles adhere to.

31. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-10-16 | ID: 10102997

Abstract: Disclosed herein are a high-voltage generator for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target, and

an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerized tomography. In particular, the high-voltage generator includes a shield electrode electrically connected intermediate of a first voltage multiplier and a second voltage multiplier. The electron beam apparatus includes control photodetectors and photo emitters having a transparent conductive shield arranged therebetween. The rotary vacuum seal includes a pumpable chamber at a position intermediate between high-pressure and low-pressure ends of a bore for a rotating shaft. The rotary target assembly is configured such that when a torque between a bearing housing and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target has a plurality of target plates supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

32. Method of forming a multi-layered coating with columnar microstructure and branched columnar microstructure

Date: 2018-10-23 | ID: 10106882

Abstract: A method includes forming a multi-layered ceramic barrier coating under a chamber pressure of greater than 1 Pascals. In the method, low- and high-dopant ceramic materials are evaporated using input evaporating energies that fall, respectively, above and below a threshold for depositing the materials in a columnar microstructure (low-dopant) and in a branched columnar microstructure (high-dopant).

33. Optical modulator

Date: 2018-11-06 | ID: 10120212

Abstract: A novel phase shifter design for carrier depletion based silicon modulators, based on an experimentally validated model, is described. It is believed that the heretofore neglected effect of incomplete ionization will have a significant impact on ultra-responsive phase shifters. A low VL product of 0.3V·cm associated with a low propagation loss of 20 dB/cm is expected to be observed. The phase shifter is based on overlapping implantation steps, where the doses and energies are carefully chosen to utilize counter-doping to produce an S-shaped junction. This junction has a particularly attractive VL figure of merit, while simultaneously achieving attractively low capacitance and optical loss. This improvement will enable significantly smaller Mach-Zehnder modulators to be constructed that nonetheless would have low drive voltages, with substantial decreases in insertion loss. The described fabrication process is of minimal

complexity; in particular, no high-resolution lithographic step is required.

34. Beam shaping assembly for neutron capture therapy

Date: 2018-11-13 | ID: 10124192

Abstract: A beam shaping assembly for neutron capture therapy includes a beam inlet, a target having nuclear reaction with an incident proton beam from the beam inlet to produce neutrons forming a neutron beam defining a main axis, a moderator adjoining to the target, a reflector surrounding the moderator, a thermal neutron absorber adjoining to the moderator, a radiation shield arranged inside the beam shaping assembly and a beam outlet. The neutrons are moderated to epithermal neutron energies. The reflector leads the neutrons deviated from the main axis back, and a gap channel is arranged between the moderator and the reflector. The thermal neutron absorber is used for absorbing thermal neutrons so as to avoid overdosing in superficial normal tissue during therapy. The radiation shield is used for shielding leaking neutrons and photons so as to reduce dose of the normal tissue not exposed to irradiation.

35. Method of simulating formation of lithography features by self-assembly of block copolymers

Date: 2018-11-13 | ID: 10127336

Abstract: A method of determining an uncertainty in the position of a domain within a self-assembly block copolymer (BCP) feature. The method includes simulating a BCP feature, calculating a minimum energy position of a first domain within the simulated BCP feature, simulating the application of a potential that causes the position of the first domain to be displaced from the minimum energy position, simulating release of the potential back toward the minimum energy, recording a plurality of energies of the BCP feature during the release and recording at each of the plurality of energies a displacement of the first domain from the minimum energy position, calculating, from the recorded energies and recorded displacements, a probability distribution indicating a probability of the first domain being displaced from the minimum energy position, and, from the probability distribution, calculating an uncertainty in the position of the first domain within the BCP feature.

36. Three-dimensional imaging in charged-particle microscopy

Date: 2018-11-13 | ID: 10128080

Abstract: A method of investigating a specimen using charged-particle microscopy, and a charged particle microscope configured for same. In one embodiment, the method includes: (a) selecting a virtual sampling grid on a surface of a specimen, the virtual sampling grid extending in an XY plane and comprising nodes to be impinged upon by a beam of charged particles; (b) selecting a landing energy for the beam, the landing

energy associated with a penetration depth; (c) generating a scan image by irradiating the specimen at each of the nodes with the beam, and detecting output radiation emanating from the specimen in response thereto; (d) repeating steps (b) and (c) for a series of different landing energies corresponding to an associated series of penetration depths, (e) pre-selecting an energy increment by which the landing energy is to be altered after a first iteration of steps (b) and (c); (f) associating the energy increment with a corresponding depth increment; (g) selecting the virtual sampling grid to have a substantially equal node pitch p in X and Y , which pitch p is matched to the value of the depth increment so as to produce a substantially cubic sampling voxel; and (h) selecting subsequent energy values in the series of landing energies so as to maintain a substantially constant depth increment between consecutive members of the series of penetration depths.

37. Layer structure for a group-III-nitride normally-off transistor

Date: 2018-11-13 | ID: 10128362

Abstract: A layer structure for a normally-off transistor has an electron-supply layer made of a group-III-nitride material, a back-barrier layer made of a group-III-nitride material, a channel layer between the electron-supply layer and the back-barrier layer, made of a group-III-nitride material having a band-gap energy that is lower than the band-gap energies of the other layer mentioned. The material of the back-barrier layer is of p-type conductivity, while the material of the electron-supply layer and the material of the channel layer are not of p-type conductivity, the band-gap energy of the electron-supply layer is smaller than the band-gap energy of the back-barrier layer. In absence of an external voltage a lower conduction-band-edge of the third group-III-nitride material in the channel layer is higher in energy than a Fermi level of the material in the channel layer.

38. Generation of VUV, EUV, and X-ray light using VUV-UV-VIS lasers

Date: 2018-11-13 | ID: 10128631

Abstract: A method for extending and enhancing bright coherent high-order harmonic generation into the VUV-EUV-X-ray regions of the spectrum involves a way of accomplishing phase matching or effective phase matching of extreme upconversion of laser light at high conversion efficiency, approaching 10³ in some spectral regions, and at significantly higher photon energies in a waveguide geometry, in a self-guiding geometry, a gas cell, or a loosely focusing geometry, containing nonlinear medium. The extension and enhancement of the coherent VUV, EUV, X-ray emission to high photon energies relies on using VUV-UV-VIS lasers of shorter wavelength. This leads to enhancement of macroscopic phase matching parameters due to stronger contribution of linear and nonlinear dispersion of both atoms and ions, combined with a strong microscopic single-atom yield.

39. Apparatus of plural charged-particle beams

Date: 2018-11-27 | ID: 10141160

Abstract: A secondary projection imaging system in a multi-beam apparatus is proposed, which makes the secondary electron detection with high collection efficiency and low cross-talk. The system employs one zoom lens, one projection lens and one anti-scanning deflection unit. The zoom lens and the projection lens respectively perform the zoom function and the anti-rotating function to remain the total imaging magnification and the total image rotation with respect to the landing energies and/or the currents of the plural primary beamlets. The anti-scanning deflection unit performs the anti-scanning function to eliminate the dynamic image displacement due to the deflection scanning of the plural primary beamlets.

40. Power amplifier adjustment for transmit beamforming in multi-antenna wireless systems

Date: 2018-11-27 | ID: 10141997

Abstract: One or more beamsteering matrices are applied to one or more signals to be transmitted via multiple antennas. After the one or more beamsteering matrices are applied to the one or more signals, the plurality of signals is provided to a plurality of power amplifiers coupled to the multiple antennas. Signal energies are determined for the plurality of signals provided to the plurality of power amplifiers, and relative signal energies are determined based on the determined signal energies. Output power levels of the plurality of power amplifiers are adjusted based on the determined relative signal energies.

41. Audio signal processing

Date: 2018-11-27 | ID: 10142763

Abstract: Embodiments of the present invention relate to audio signal processing. Specifically, a method for processing audio signal is provided, the method comprising: determining, for a current frame of the audio signal, frequency band energies for a plurality of predefined frequency bands at least partially based on frequency parameters of the current frame; generating frequency band gains for the plurality of predefined frequency bands by processing the frequency band energies; and generating frequency bin gains for the current frame based on the frequency band gains using predefined frequency band filter banks, the frequency band filter banks being specific to the plurality of predefined frequency bands. Corresponding system and computer program product are also disclosed.

42. Linear fitting of multi-threshold counting data

Date: 2018-12-04 | ID: 10145968

Abstract: The present disclosure provides a system and method for efficiently mining multi-threshold measurements acquired using photon counting pixel-array detectors for spectral imaging and diffraction

analyses. Images of X-ray intensity as a function of X-ray energy were recorded on a 6 megapixel X-ray photon counting array detector through linear fitting of the measured counts recorded as a function of counting threshold. An analytical model is disclosed for describing the probability density of detected voltage, utilizing fractional photon counting to account for edge/corner effects from voltage plumes that spread across multiple pixels. Three-parameter fits to the model were independently performed for each pixel in the array for X-ray scattering images acquired for 13.5 keV and 15.0 keV X-ray energies. From the established pixel responses, multi-threshold composite images produced from the sum of 13.5 keV and 15.0 keV data can be analytically separated to recover the monochromatic images through simple linear fitting.

43. Spectral CT

Date: 2018-12-04 | ID: 10147168

Abstract: Aspects include estimating structure models for a voxel(s) of a spectral image. The estimation is based on a noise model. Aspects further include fitting structure models to a 3D neighborhood about the voxel(s), selecting one of the structure models for the voxel(s) which is based on the fittings and predetermined model selection criteria. Aspects further include de-noising the voxel(s) based on the selected structure model, which produces a set of de-noised spectral images. Other aspects include generating a virtual contrast enhanced intermediate image for each energy image of a set of spectral images. The energies correspond to different energy ranges which are based on de-noised spectral images, decomposed de-noised spectral images, an iodine map, and a contrast enhancement factor. Aspects further include generating final virtual contrast enhanced images. The final virtual contrast enhanced images are generated by incorporating a simulated partial volume effect with the intermediate virtual contrast enhanced images.

44. Induced-flow wind power system

Date: 2018-12-25 | ID: 10161382

Abstract: A high efficiency induced-flow wind power system engages and converts both potential (to-pull) and kinetic (to-push) wind energies to effective airflow power, delivering induced (accelerated) airflow power in a controlled flow field to a turbine/rotor, impelling a 360-degree torque on the turbine/rotor and, as a result, extracting (converting) more than 80% of the combined effective wind power to mechanical power. The induced push-pull effect results in higher efficiency wind-to-mechanical power extraction (conversion). The induced-flow wind power system can be coupled with (i) an electrical generator, inverter/converter for generating AC and DC power, (ii) pressurized vessel for effective energy storage (iii) a pressurized structure, such as an air supported structure, to ensure its structural integrity. The Induced-Flow Wind System embodiment comprises: a passive-flow nozzle, an active-flow nozzles and a turbine encased in housing interposed within the flow field of the active-flow nozzle and coupled with an electrical generator or a

compressor.

45. Photovoltaic device having an electrically conductive transparent substrate and light absorbing compound

Date: 2018-12-25 | ID: 10163578

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type portions in which at least one of an oxadiazole isomer acts as a -conjugated bridge (spacer), a biphenyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell and in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

46. Light emission module with enhanced control in particular for a motor vehicle

Date: 2018-12-25 | ID: 10165641

Abstract: A light emission module, in particular for a motor vehicle. The module includes a substrate comprising a curved main portion extending in a longitudinal direction. A plurality of electroluminescent elements is arranged on the substrate and configured to emit light rays when supplied with electrical energy. The electroluminescent elements are distributed along the longitudinal direction, and a control assembly suitable for regulating the electrical energy supplied to the electroluminescent elements. The control assembly has a mode of operation in which the control assembly is configured to supply the electroluminescent elements with respective electrical energies and/or powers determined at least as a function of respective main directions of light emission of the electroluminescent elements to obtain at least two maximum light intensities emitted by the electroluminescent elements in the corresponding main direction of emission which are different along the longitudinal direction of the substrate.

47. Dye sensitized photoelectric conversion device

Date: 2019-01-01 | ID: 10170250

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type molecules in which at least one of an oxadiazole group acts as a -conjugated bridge (spacer), a naphthyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the

-conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell. The dye for use in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

48. Method for heat treating a tool

Date: 2019-01-08 | ID: 10173283

Abstract: A method for heat treating a hand tool wherein generally conical or pyramidal shaped laser beams are generated and have respective apexes or focal points of different thermal energies operably disposed with respect to differently configured portions and masses of the hand tool for simultaneous different effective heat treatment.

49. Li-ion battery capacity and voltage prediction using quantum simulations

Date: 2019-01-08 | ID: 10177398

Abstract: Provided are methods and computer programs for predicting lithium battery properties. One method includes operations for selecting candidate structures for the battery, and for obtaining a plurality of delithiated structures of the candidate structures with different lithium concentrations. The quantum mechanical (QM) energies of the delithiated structures are calculated, and a functional form is developed to obtain the voltage of the lithium battery. The functional form is a function of the lithium concentration and is based on the QM energies of the delithiated structures. Further, the capacity of the lithium battery is calculated based on a selected lithium concentration, where the functional form returns a cut-off voltage of the lithium battery when the lithium concentration is equal to the selected lithium concentration.

50. Strain-control heterostructure growth

Date: 2019-01-15 | ID: 10181398

Abstract: A solution for fabricating a group III nitride heterostructure and/or a corresponding device is provided. The heterostructure can include a nucleation layer, which can be grown on a lattice mismatched substrate using a set of nucleation layer growth parameters. An aluminum nitride layer can be grown on the nucleation layer using a set of aluminum nitride layer growth parameters. The respective growth parameters can be configured to result in a target type and level of strain in the aluminum nitride layer that is conducive for growth of additional heterostructure layers resulting in strains and strain energies not exceeding threshold values which can cause relaxation and/or dislocation formation.

51. Delivery of audio and tactile stimulation therapy for animals and humans

Date: 2019-01-22 | ID: 10182964

Abstract: A system for providing a therapeutic treatment to a mammal for a selected mammalian condition includes a wearable member configured for use about an upper torso of a mammal and an energy module configured to generate energy waves in an energy range particularly configured to provide a stimulation that is therapeutically effective treatment for the selected mammalian condition. The energy module is adapted to be supported by the wearable member about the upper torso of the mammal. The wearable member also includes a therapy delivery portion configured to position the energy module at a treatment site about the upper torso. The underlying idea of the teachings herein is to deliver non-invasive, non-electrical-inducing therapies and energies such as vibroacoustic, physioacoustic, kinesitherapy and phototherapy, through wearable and non-wearable apparatuses to animals and humans for therapeutic treatment.

52. Batch-processing method for super-high aspect ratio diffractive optics

Date: 2019-01-22 | ID: 10183375

Abstract: A method for fabrication of diffractive optics by batch processing is disclosed, having applicability to high resolution ultra-high aspect ratio Fresnel Zone Plates for focusing of X-rays or gamma-rays having energies up to hundreds of keV. An array of precursor forms is etched into a planar substrate. Sidewalls of the forms are smoothed to a required surface roughness. A sequence of alternating layers of different complex refractive index, for binary or higher order diffractive optics, are deposited on the precursor forms by atomic layer deposition (ALD), to provide diffractive line patterns. Thinnest layers may have nanometer thicknesses. After front surface planarization and thinning of the substrate to expose first and second surfaces of the diffractive line patterns of the diffractive optic, the height h in the propagation direction provides a designed absorption difference and/or phase shift difference between adjacent diffractive lines. Optionally, post-processing enhances mechanical, thermal, electrical and optical properties.

53. Stamping method and components produced thereby

Date: 2019-01-29 | ID: 10189384

Abstract: A method for producing vehicle seat components involves working a semifinished blank in a cutting manner. The method can be carried out easily and at low cost and makes it possible to produce components that require little reworking and also provides a vehicle seat component that is both suitable for reducing crash energies by deformation and has an adequate wear resistance. The method includes local heating of the semifinished blank in the region of an intended cutting line of the vehicle seat components to be cut out and cutting out the vehicle seat components from the semifinished blank along the cutting line during or

shortly after the heating.

54. Methods for operating electrostatic trap mass analyzers

Date: 2019-01-29 | ID: 10192730

Abstract: A method of operating an electrostatic trapping mass analyzer, comprising: introducing a sample of ions into a trapping region of the mass analyzer, wherein a trapping field within the trapping region is such that the ions exhibit radial motion with respect to a central longitudinal axis of the trapping region while undergoing harmonic motion in a dimension defined by the central longitudinal axis, the frequency of harmonic motion of a particular ion being a function of its mass-to-charge ratio; superimposing a modulation field onto the trapping field within the trapping region, the modulation field acting to either increase or reduce the harmonic motion energies of the ions by an amount varying according to the frequency of harmonic motion; and acquiring a mass spectrum of the ions in the trapping region by measuring a signal representative of an image current induced by the harmonic motion of the ions.

55. Organic light-emitting device having delayed fluorescence

Date: 2019-01-29 | ID: 10193094

Abstract: The present application relates to an organic electroluminescent device (OLED) which has an emitting layer comprising a compound having a small difference between the energies of the S1 and T1 states, and in which certain conditions apply to the HOMO and LUMO energy levels of the emitting layer and the layers between the anode and the emitting layer.

56. Bandwidth reduction with beamforming and data compression

Date: 2019-01-29 | ID: 10194441

Abstract: Described are techniques for limiting bandwidth requirements for user equipment UE data sent on a front haul link between a remote radio head RRH and a baseband unit BBU. For a given UE a subset of a plurality of beams is selected based on received energies of the plurality of beams, and for the given UE only data from the selected subset of beams transmitting on a front haul link. Multiple techniques are detailed for how the subset is selected, including (when UE allocation information is available) averaged received beam energy, total received beam energy, maximum received beam energy and also (when UE allocation information is not available). For further bandwidth reduction a special data compression technique uses the received energies of each beam to select a minimum gain offset value after dividing the data into I and Q components.

57. Laser spot tracking receiver

Date: 2019-02-05 | ID: 10197677

Abstract: A technique for is presented for locating at least one object illuminated by a laser designator. A detector and an optical unit are provided. The one optical unit is configured for receiving a beam of laser light scattered by the at least one object being illuminated by the laser designator, for creating two secondary beams, and for focusing the two secondary beams to respective foci along an optical axis of the at least one optical unit. The detector is located between the two foci, divided into an even number of portions, and is configured for measuring an intensity of impinging light at each portion. The optical unit is configured for causing the received laser light to impinge the detector, such that an upright image and an inverted image of the scattered laser light beam having substantially equal sizes and substantially equal energies are projected on the detector.

58. Method for autonomous self-blanking by radiation portal monitors to minimize the interference from pulsed X-rays radiation

Date: 2019-02-05 | ID: 10197700

Abstract: A system and associated method for isolating intended radiation signals for determining target characteristics includes multiple detectors for detecting radiation signals having varying energies, delay modules for delaying the detected radiation signals and a discriminator associated with the multiple detectors for determining if detected radiation signals include unintended radiation signals, e.g., x-rays, and provided blanking signals to a switch in order to effectively remove the unintended radiation signals from the data that is presented to the processor for determining target characteristics.

59. Differentiating a flow rate error and a dynamic error of an exhaust gas recirculation system

Date: 2019-02-12 | ID: 10202915

Abstract: A method and a computer program for recognizing and differentiating a flow rate error and a dynamic error of an exhaust gas recirculation system (EGR) of an internal combustion engine. Measured and modeled EGR mass flow signals are each subjected to bandpass filtering using time constants optimized for determining flow rate errors and bandpass filtering using time constants optimized for determining dynamic errors. The energy is determined for each of the filtered signals and an energy quotient is computed between the energies of the signals filtered for dynamic errors and the signals filtered for flow rate errors. A dynamic error and a flow rate error of the exhaust gas recirculation may be recognized and differentiated from one another on the basis of the energy quotients.

60. LMFP cathode materials with improved electrochemical performance

Date: 2019-02-12 | ID: 10205158

Abstract: Particulate LMFP cathode materials having high manganese contents and small amounts of dopant metals are disclosed. These cathode materials are made by milling a mixture of precursor materials in a wet or dry milling process. Preferably, off-stoichiometric amounts of starting materials are used to make the cathode materials. Unlike other high manganese LMFP materials, these cathode materials provide high specific capacities, very good cycle life and high energies even at high discharge rates.

61. Compensation for overlapping scan lines in a scanning-beam display system

Date: 2019-02-26 | ID: 10218947

Abstract: A display system includes a display screen, a plurality of subsystems, and a control system. The plurality of subsystems each generate an excitation beam that carries image information and a servo beam. For each subsystem, a servo feedback detector receives feedback light of the servo beam, detects the servo feedback mark, and produces a monitor signal. For each subsystem, a control unit is operable to adjust optical energies carried by the excitation beam using a scaling factor. Two adjacent subsystems of the plurality of subsystems are configured such that in operation the areas scanned by the excitation beams of the two subsystems overlap in an overlap region. The control system is configured to determine a range of the overlap region based on the monitor signals from the servo feedback detectors of the adjacent subsystems, and to determine the scaling factors for the excitation beams for the overlap region.

62. Multi-photon absorption for femtosecond micromachining and refractive index modification of tissues

Date: 2019-03-12 | ID: 10226381

Abstract: By adapting femtosecond micromachining approaches developed in hydrogels, we can perform Intra-tissue Refractive Index Shaping (IRIS) in biological tissues. We reduced femtosecond laser pulse energies below the optical breakdown thresholds to create grating patterns that are associated with a change in the refractive index of the tissue. To increase two-photon absorption, we used a two (or more)-photon-absorbing chromophore.

63. Thermal processing with line beams

Date: 2019-03-12 | ID: 10226837

Abstract: Multi-beam, multi-wavelength processing systems include two or more lasers configured to provide respective beams to a substrate. The beams have wavelengths, pulse durations, beam areas, beam

intensities, pulse energies, polarizations, repetition rates, and other beam properties that are independently selectable. Substrate distortion in processes requiring local heating can be reduced by preheating with a large area beam at a first wavelength followed by exposure to a focused beam at a second wavelength so as to heat a local area to a desired process temperature. For some processing, multiple wavelengths are selected to obtain a desired energy deposition within a substrate.

64. Mass spectrometer with laser system for producing photons of different energies

Date: 2019-03-19 | ID: 10236173

Abstract: The invention relates to mass spectrometers with optically pumped lasers, whose laser light can be used for ionization by laser desorption, for the fragmentation of ions by photodissociation (PD), for the initiation of ion reactions, and for other purposes. The invention provides a laser system for a mass spectrometer, with which at least two laser beams of different wavelengths can be generated for use at different points along an ion path from an ion source to an ion detector in the mass spectrometer.

65. Rotating high-density fusion reactor for aneutronic and neutronic fusion

Date: 2019-04-09 | ID: 10255998

Abstract: A fusion device produces fusion of neutral atoms and ions in an aneutronic fusion manner without neutrons as products utilizes strong ion-neutral coupling at high neutral densities. Ions and neutrals rotate together in a cylindrical chamber due to frequent collisions. High magnetic forces make the attainment of high rotation energy possible; the magnetic field in a medium can be set at very high values because of the absence of magnetic charges. The repeated acceleration by strong magnetic forces in the azimuthal direction makes possible very high ion velocity. Fusion takes place mainly between neutral particles. This approach can be applied to fusion with neutrons as well. Conventional fusion schemes and neutron sources can be realized using the principles described above in the generation of neutrals of high energies and densities.

66. Apparatus and method for decoding or encoding an audio signal using energy information values for a reconstruction band

Date: 2019-04-30 | ID: 10276183

Abstract: An apparatus for decoding an encoded audio signal having an encoded representation of a first set of first spectral portions and an encoded representation of parametric data indicating spectral energies for a second set of second spectral portions, has: an audio decoder for decoding the encoded representation of the first set of the first spectral portions to obtain a first set of first spectral portions and for decoding the encoded representation of the parametric data to obtain a decoded parametric data for the second set of second spectral portions indicating, for individual reconstruction bands, individual energies; a frequency

regenerator for reconstructing spectral values in a reconstruction band having a second spectral portion using a first spectral portion of the first set of the first spectral portions and an individual energy for the reconstruction band, the reconstruction band having a first spectral portion and the second spectral portion.

67. Semiconductor device including superjunction structure formed using angled implant process

Date: 2019-04-30 | ID: 10276387

Abstract: A semiconductor device includes a superjunction structure formed using simultaneous N and P angled implants into the sidewall of a trench. The simultaneous N and P angled implants use different implant energies and dopants of different diffusion rate so that after annealing, alternating N and P thin semiconductor regions are formed. The alternating N and P thin semiconductor regions form a superjunction structure where a balanced space charge region is formed to enhance the breakdown voltage characteristic of the semiconductor device.

68. Neutron detector and dose rate meter using beryllium-loaded materials

Date: 2019-05-07 | ID: 10281600

Abstract: An apparatus and method for improving the sensitivity and energy response of neutron detectors and neutron dose rate meters. A beryllium layer is added to neutron detector moderators to improve the sensitivity of the detector. Energy dependence of the sensitivity is optimized by controlling the amount of beryllium in the moderator and by specifying the geometrical design parameters. The beryllium layer, in combination with additional material layers in the moderator, makes the detector response function correspond to the theoretical one in a wide range of energies. Response parameters of the neutron dose rate meter are within 20% of the theoretical response function in the neutron energy range from 500 keV to 10 GeV, and also in the energy range corresponding to thermal neutrons (about 1-100 meV).

69. Processing of audio signals during high frequency reconstruction

Date: 2019-05-07 | ID: 10283122

Abstract: The application relates to HFR (High Frequency Reconstruction/Regeneration) of audio signals. In particular, the application relates to a method and system for performing HFR of audio signals having large variations in energy level across the low frequency range which is used to reconstruct the high frequencies of the audio signal. A system configured to generate a plurality of high frequency subband signals covering a high frequency interval from a plurality of low frequency subband signals is described. The system comprises means for receiving the plurality of low frequency subband signals; means for receiving a set of target energies, each target energy covering a different target interval within the high frequency interval and being

indicative of the desired energy of one or more high frequency subband signals lying within the target interval; means for generating the plurality of high frequency subband signals from the plurality of low frequency subband signals and from a plurality of spectral gain coefficients associated with the plurality of low frequency subband signals, respectively; and means for adjusting the energy of the plurality of high frequency subband signals using the set of target energies.

70. Strain capacitor energy storage devices and assemblies

Date: 2019-05-07 | ID: 10283282

Abstract: Energy storage devices are disclosed that store both electrical and mechanical energies, making the total energy stored larger than either an electrical or mechanical means alone. The energy storage device is charged by the application of a voltage, which charges a capacitor to store electrical energy while simultaneously exerting a force on the mechanical system that deforms the mechanical system, resulting in mechanical energy storage. When the charged device is discharged, both the electrical and mechanical energy are extracted in electrical form. Its unique features include, but are not limited to, the potential for long lifetime, improved safety, better portability, a wide operating temperature range, and environment friendliness. Arrays of energy storage devices can be assembled in various configurations to build high capacity energy storage units.

71. Base station and method for operating the base station

Date: 2019-05-07 | ID: 10284255

Abstract: Present disclosure relates to a base station and a method for operating the same. The base station includes a communicating unit and a processing unit. The communicating unit is wirelessly connected to user equipments in the internet of things. The communicating unit is configured to receive a frequency hopping preamble sequence from a user equipment. The processing unit, electrically coupled to the communicating unit, is configured to obtain frequency hopping energies corresponding to a plurality of symbol groups from the frequency hopping preamble sequence. The processing unit is configured to accumulate the frequency hopping energies and calculate an average energy corresponding to one symbol group according to the accumulated frequency hopping energies. The processing unit is configured to calculate a threshold based on the average energy and a false alarm rate, wherein the threshold is applied to determine whether signals sending from the user equipment are noises.

72. Apodization of spurs in radar receivers using multi-channel processing

Date: 2019-05-14 | ID: 10288729

Abstract: The various technologies presented herein relate to identification and mitigation of spurious

energies or signals (aka spurs) in radar imaging. Spurious energy in received radar data can be a consequence of non-ideal component and circuit behavior. Such behavior can result from I/Q imbalance, nonlinear component behavior, additive interference (e.g. cross-talk, etc.), etc. The manifestation of the spurious energy in a radar image (e.g., a range-Doppler map) can be influenced by appropriate pulse-to-pulse phase modulation. Comparing multiple images which have been processed using the same data but of different signal paths and modulations enables identification of undesired spurs, with subsequent cropping or apodization of the undesired spurs from a radar image. Spurs can be identified by comparison with a threshold energy. Removal of an undesired spur enables enhanced identification of true targets in a radar image.

73. Communications interface facilitating operations of a persistent spatially-optimized computer-based simulation

Date: 2019-05-14 | ID: 10289767

Abstract: Methods, systems, computer-readable media, and apparatuses for performing, providing, managing, executing, and/or running a spatially-optimized simulation are presented. In one or more embodiments, the spatially-optimized simulation may comprise a plurality of worker modules performing the simulation, a plurality of entities being simulated among the plurality of worker modules, a plurality of bridge modules facilitating communication between workers and an administrative layer including a plurality of chunk modules, at least one receptionist module, and at least one oracle module. The spatially-optimized simulation may be configured to provide a distributed, persistent, fault-tolerant and spatially-optimized simulation environment. In some embodiments, load balancing and fault tolerance may be performed using transfer scores and/or tensile energies determined among the candidates for transferring simulation entities among workers. In some embodiments, the plurality of bridge modules may expose an application programming interface (API) for communicating with the plurality of worker modules.

74. Charged particle beam device and pattern measurement device

Date: 2019-05-14 | ID: 10290464

Abstract: The present invention provides a charged particle beam device capable of predicting the three-dimensional structure of a sample, without affecting the charge of the sample. The present invention provides a charged particle beam device characterized in that a first distance between the peak and the bottom of a first signal waveform obtained on the basis of irradiation with a charged particle beam having a first landing energy, and a second distance between the peak and the bottom of a second signal waveform obtained on the basis of irradiation with a charged particle beam having a second landing energy different

from the first landing energy are obtained, and the distance between the peak and the bottom at a landing energy (zero, for instance) different from the first and second landing energies is obtained on the basis of the extrapolation of the first distance and the second distance.

75. Traffic lights control for fuel efficiency

Date: 2019-05-21 | ID: 10297151

Abstract: Data is received from each of a plurality of vehicles proximate to an intersection indicating a kinetic energy and a time to the intersection. An optimized timing of a traffic light is determined based on an aggregation of the kinetic energies and times to intersection. A timing of the traffic is modified according to the optimized timing.

76. X-ray illumination system with multiple target microstructures

Date: 2019-05-21 | ID: 10297359

Abstract: An x-ray illumination beam system includes an electron emitter and a target having one or more target microstructures. The one or more microstructures may be the same or different material, and may be embedded or placed atop a substrate formed of a heat-conducting material. The x-ray source may emit x-rays towards an optic system, which can include one or more optics that are matched to one or more target microstructures. The matching can be achieved by selecting optics with the geometric shape, size, and surface coating that collects as many x-rays as possible from the source and at an angle that satisfies the critical reflection angle of the x-ray energies of interest from the target. The x-ray illumination beam system allows for an x-ray source that generates x-rays having different spectra and can be used in a variety of applications.

77. Load balancing systems and methods for spatially-optimized simulations

Date: 2019-05-28 | ID: 10303821

Abstract: Methods, systems, computer-readable media, and apparatuses for performing, providing, managing, executing, and/or running a spatially-optimized simulation are presented. In one or more embodiments, the spatially-optimized simulation may comprise a plurality of worker modules performing the simulation, a plurality of entities being simulated among the plurality of worker modules, a plurality of bridge modules facilitating communication between workers and an administrative layer including a plurality of chunk modules, at least one receptionist module, and at least one oracle module. The spatially-optimized simulation may be configured to provide a distributed, persistent, fault-tolerant and spatially-optimized simulation environment. In some embodiments, load balancing and fault tolerance may be performed using transfer scores and/or tensile energies determined among the candidates for transferring simulation entities among

workers. In some embodiments, the plurality of bridge modules may expose an application programming interface (API) for communicating with the plurality of worker modules.

78. Photovoltaic device with transparent glass substrate and dye-sensitized solar cell

Date: 2019-05-28 | ID: 10304636

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type portions in which at least one of an oxadiazole isomer acts as a -conjugated bridge (spacer), a biphenyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell and in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

79. Radiation therapy systems and methods

Date: 2019-06-04 | ID: 10307618

Abstract: A radiation therapy system includes an accelerator and beam transport system that generates a beam of particles. The accelerator and beam transport system guides the beam on a path and into a nozzle that is operable for aiming the beam toward an object. The nozzle includes a scanning magnet operable for steering the beam toward different locations within the object, and also includes a beam energy adjuster configured to adjust the beam by, for example, placing different thicknesses of material in the path of the beam to affect the energies of the particles in the beam.

80. Controlling waveforms to reduce cross-talk between inkjet nozzles

Date: 2019-06-04 | ID: 10308013

Abstract: An inkjet printhead includes two groups of interleaved nozzles. First and second sets of drop-formation waveforms are associated with the groups of nozzles to selectively cause portions of a liquid jet to break off into drops. A timing delay device time-shifts the second-group waveforms relative to those associated with the first-group waveforms. A charging-electrode waveform having portions with first and second potentials is provided to a charging electrode. The waveform energies of the second-group waveforms is larger than the waveform energies of the corresponding first-group waveforms so that printing drops break off from the liquid jets while the charging-electrode is at the first potential, and non-printing drops break off from the liquid jets while the charging-electrode is at the second potential.

81. Voice quality conversion device, voice quality conversion method and program

Date: 2019-06-04 | ID: 10311888

Abstract: A voice conversion device includes: a parameter learning unit in which a probabilistic model that uses speech information, speaker information, and phonological information as variables to thereby express relationships among binding energies between any two of the speech information, the speaker information and the phonological information by parameters is prepared, wherein the speech information is obtained based on a speech, the speaker information corresponds to the speech information, and the phonological information expresses the phoneme of the speech, and in which the parameters are determined by performing learning by sequentially inputting the speech information and the speaker information into the probabilistic model; and a voice conversion processing unit that performs voice conversion processing of the speech information obtained on the basis of the speech of an input speaker, based both on the parameters determined by the parameter learning unit and on the speaker information of a target speaker.

82. Coherent combining pulse bursts in time domain

Date: 2019-06-04 | ID: 10312657

Abstract: A beam combining and pulse stacking technique is provided that enhances laser pulse energy by coherent stacking pulse bursts (i.e. non-periodic pulsed signals) in time domain. This energy enhancement is achieved by using various configurations of Fabry-Perot, Gires-Tournois and other types of resonant cavities, so that a multiple-pulse burst incident at either a single input or multiple inputs of the system produces an output with a solitary pulse, which contains the summed energy of the incident multiple pulses from all beams. This disclosure provides a substantial improvement over conventional coherent-combining methods in that it achieves very high pulse energies using a relatively small number of combined laser systems, thus providing with orders of magnitude reduction in system size, complexity, and cost compared to current combining approaches.

83. Target expansion rate control in an extreme ultraviolet light source

Date: 2019-06-04 | ID: 10314153

Abstract: A method includes providing a target material that comprises a component that emits extreme ultraviolet (EUV) light when converted to plasma; directing a first beam of radiation toward the target material to deliver energy to the target material to modify a geometric distribution of the target material to form a modified target; directing a second beam of radiation toward the modified target, the second beam of radiation converting at least part of the modified target to plasma that emits EUV light; measuring one or more characteristics associated with one or more of the target material and the modified target relative to the

first beam of radiation; and controlling an amount of radiant exposure delivered to the target material from the first beam of radiation based on the one or more measured characteristics to within a predetermined range of energies.

84. Laser eye surgery system calibration

Date: 2019-06-11 | ID: 10314746

Abstract: The amount of energy to provide optical breakdown can be determined based on mapped optical breakdown thresholds of the treatment volume, and the laser energy can be adjusted in response to the mapped breakdown thresholds. The mapping of threshold energies can be combined with depth and lateral calibration in order to determine the location of optical breakdown along the laser beam path for an amount of energy determined based on the mapping. The mapping can be used with look up tables to determine mapped locations from one reference system to another reference system.

85. Ultra-responsive phase shifters for depletion mode silicon modulators

Date: 2019-06-11 | ID: 10317710

Abstract: A novel phase shifter design for carrier depletion based silicon modulators, based on an experimentally validated model, is described. It is believed that the heretofore neglected effect of incomplete ionization will have a significant impact on ultra-responsive phase shifters. A low VL product of 0.3 V·cm associated with a low propagation loss of 20 dB/cm is expected to be observed. The phase shifter is based on overlapping implantation steps, where the doses and energies are carefully chosen to utilize counter-doping to produce an S-shaped junction. This junction has a particularly attractive VL figure of merit, while simultaneously achieving attractively low capacitance and optical loss. This improvement will enable significantly smaller Mach-Zehnder modulators to be constructed that nonetheless would have low drive voltages, with substantial decreases in insertion loss. The described fabrication process is of minimal complexity; in particular, no high-resolution lithographic step is required.

86. Ultra broad band continuously tunable electron beam pulser

Date: 2019-06-11 | ID: 10319556

Abstract: An ElectroMagnetic-Mechanical Pulser (EMMP) generates electron pulses at a continuously tunable rate between 100 MHz and 20-50 GHz, with energies up to 0.5 MeV, duty cycles up to 20%, and pulse widths between 100 fs and 10 ps. A dielectric-filled Traveling Wave Transmission Stripline (TWTS) that is terminated by an impedance-matching load such as a 50 ohm load imposes a transverse modulation on a continuous electron beam. The dielectric is configured such that the phase velocity of RF propagated through the TWTS matches a desired electron energy, which can be between 100 and 500 keV, thereby transferring

electromagnetic energy to the electrons. The beam is then chopped into pulses by an adjustable aperture. Pulse dispersion arising from the modulation is minimized by a suppressing section that includes a mirror demodulating TWTS, so that the spatial and temporal coherence of the pulses is substantially identical to the input beam.

87. Method of determining crystallographic properties of a sample and electron beam microscope for performing the method

Date: 2019-06-11 | ID: 10319560

Abstract: A method of determining crystallographic properties of a sample includes: generating first and second electron beams of electrons having first and second mean kinetic energies, respectively; detecting, for each of first locations of a region of the sample, a two-dimensional spatial distribution of electrons incident onto a detection area while directing the first electron beam onto the first locations; generating, for each of the first locations, first data representing the two-dimensional spatial distribution; detecting, for each of second locations of the region of the sample, a two-dimensional spatial distribution of electrons incident onto the detection area while directing the second electron beam onto the second locations; generating, for each of the second locations, second data representing the two-dimensional spatial distribution; and determining the crystallographic properties for target locations of the region based on the first data of the first locations and the second data of the second locations.

88. Space ion analyzer with mass spectrometer on a chip (MSOC) using floating MSOC voltages

Date: 2019-06-11 | ID: 10319572

Abstract: A space ion analyzer in a spacecraft includes an axis and an aperture to receive an ion stream. An ion focuser to focus the ion stream along the axis responsive to a focus voltage, and an ion deflector deflects ions from the axis based on energies of the ions and a deflector voltage difference applied across plates of the ion deflector. A mass spectrometer on a chip (MSOC) directs ions from the ion deflector to an ion detector array responsive to an MSOC voltage difference applied to the MSOC. A focus voltage generator generates the focus voltage as a variable voltage referenced to a spacecraft ground. A deflector voltage generator generates the deflector voltage difference with a controllable magnitude and referenced to the spacecraft ground. An MSOC voltage generator generates the MSOC voltage difference with a controllable magnitude and referenced to a breaking potential controllable relative to the spacecraft ground.

89. Low energy laser spectroscopy LELS

Date: 2019-06-18 | ID: 10324037

Abstract: An extremely sensitive spectroscopy method utilizes a laser modified to an extremely low emission with an integrated control system, interfaced within a typical Raman platform to comprise low energy laser spectroscopy (LELS). LELS acquires and utilizes a quantum entangled state of photons and particles, including omnipresent cosmological dark matter particles (OCDM) and omnipresent cosmological dark energy (OCDE). The OCDM and OCDE matter has an affinity to particles of same OCDM and OCDE matter in target specimens, with same-time data results of high sensitivity. In a semiconductor light emitter, electron flow at a low energy level is provided to a quantum well to produce a quantum tunneling of electrons into an active region of the laser quantum well and creating sublasering. Sublasering allows OCDM and OCDE to become entangled with other particles and energies in the laser's quantum well and create a transmission package comprising quantum entangled fields, waves, wave packages, states and energies. Providing a triggering pulse causes a second tunneling, carrying the transmission package for emission.

90. Organic light emitting device

Date: 2019-06-18 | ID: 10325960

Abstract: An organic light-emitting device and display apparatus, the device including a first electrode; a second electrode facing the first electrode; an emission layer between the first and second electrode; a hole control layer between the first electrode and the emission layer; and an electron control layer between the emission layer and the second electrode, wherein the emission layer includes a plurality of sub-emission layers to emit light having different wavelengths, at least portions of the plurality of sub-emission layers do not overlap one another, the plurality of sub-emission layers include: a first sub-emission layer including a first color light-emitting dopant, and a second sub-emission layer including a second color light-emitting dopant, the first and second sub-emission layers each include a hole-transporting and electron-transporting host which form an exciplex, and a triplet energy of the exciplex is equal to or greater than triplet energies of the first and second color light-emitting dopant.

91. Renal injury inhibiting devices, systems, and methods employing low-frequency ultrasound or other cyclical pressure energies

Date: 2019-06-25 | ID: 10328287

Abstract: Improved devices, systems, and methods treatment of patients can be used to help mitigate injury to the kidneys by applying cyclical mechanical pressure energy at low intensities. The energy often be selectively directed from non-invasive transducers disposed outside the patients. The energy will typically comprise low frequency ultrasound energy, shock wave energy, or the like, and may induce the generation

and/or release of nitric oxide, thereby enhancing perfusion and ameliorating tissue damage. Superimposed micro and macro duty cycles may help avoid thermal and other injury to tissues of the patient during treatment. Bilateral treatments are facilitated by a support structure that orients at least one transducer toward each kidney.

92. Methods and systems for testing luminescent semiconductors

Date: 2019-06-25 | ID: 10330614

Abstract: Methods and systems using low temperature thermo-luminescence to measure donor ionization energies in luminescence semiconductors are described.

93. Apparatus and method for decoding or encoding an audio signal using energy information values for a reconstruction band

Date: 2019-06-25 | ID: 10332531

Abstract: An apparatus for decoding an encoded audio signal having an encoded representation of a first set of first spectral portions and an encoded representation of parametric data indicating spectral energies for a second set of second spectral portions, has: an audio decoder for decoding the encoded representation of the first set of the first spectral portions to obtain a first set of first spectral portions and for decoding the encoded representation of the parametric data to obtain a decoded parametric data for the second set of second spectral portions indicating, for individual reconstruction bands, individual energies; a frequency regenerator for reconstructing spectral values in a reconstruction band having a second spectral portion using a first spectral portion of the first set of the first spectral portions and an individual energy for the reconstruction band, the reconstruction band having a first spectral portion and the second spectral portion.

94. Movable type method applied to protein-ligand binding

Date: 2019-06-25 | ID: 10332616

Abstract: Disclosed herein is a method of estimating the pose of a ligand in a receptor comprising identifying all possible atom pairs of protein-ligand complexes in a given configuration space for a system that comprises proteins; creating a first database and a second database; where the first database comprises associated pairwise distant dependent energies and where the second database comprises all probabilities that include how the atom pairs can combine; combining the first database with the second database via statistical mechanics to accurately estimate binding free energies as well as a pose of a ligand in a receptor; and selecting a protein-ligand complex for further study.

95. 3D physiological detection system and operating method thereof

Date: 2019-07-02 | ID: 10335046

Abstract: A physiological detection system including an image sensor, a converting unit, a retrieving unit and a processing unit is provided. The image sensor includes a plurality of pixels respectively configured to output a PPG signal. The converting unit is configured to convert a plurality of PPG signals of a plurality of pixels regions to a plurality of frequency domain signals. The retrieving unit is configured to respectively retrieve a spectral energy of the frequency domain signals corresponding to each of the pixel regions. The processing unit is configured to construct a 3D energy distribution according to the spectral energies.

96. Cruise control system, vehicle including the same, method of controlling the cruise control system

Date: 2019-07-02 | ID: 10336328

Abstract: A cruise control system, the vehicle including the same, and the method of controlling the cruise control system are provided to improve fuel efficiency by changing control target vehicle speeds by continuously predicting vehicle speeds and variations in required driving forces on roads with various slope variations. Additionally, driving performance is improved by using kinetic energies and preventing unnecessary acceleration and deceleration in comparison with conventional vehicles. Driver convenience and satisfaction is also improved by preventing an unintended operation stop of the cruise control system caused by frequent acceleration and deceleration on roads with substantial slope variations in advance and by preventing unintended acceleration/deceleration on roads with frequent slope variations.

97. Online IGBT junction temperature estimation without the use of a dedicated temperature estimation or measurement device

Date: 2019-07-02 | ID: 10337930

Abstract: A number of variations may include a method which may include determining a temperature rise in an IGBT junction without the use of a temperature estimation or measurement device because determination may be made by first determining the power loss due to the conduction losses of the IGBT and power loss associated with switching the IGBT where these losses may be determined by utilizing the saturation voltage of the IGBT, IGBT PWM duty cycle, IGBT switching frequency, fundamental frequency along with a lookup table for the switching energies and the phase current going through the IGBT. The determined power loss may be multiplied by a measured, sensed or obtained thermal impedance from the IGBT junction. Finally, the determined temperature rise of the IGBT junction may be added to a measured, sensed or obtained temperature of the coolant in order to determine the absolute temperature of the IGBT junction.

98. Alpha/beta radiation shielding materials

Date: 2019-07-02 | ID: 10340049

Abstract: Alpha/beta radiation barrier materials and structures formed to include the barrier materials are described. Barrier materials include a matrix and particulate materials contained in the matrix. The particulates include alpha/beta radiation absorbers. Alpha/beta radiation absorbers of the barrier materials can be molecular, particulates, or defined nanostructures that are capable of absorbing incident alpha/beta particle energies. Matrix materials can include organic or inorganic materials including thermoplastic polymers, thermoset polymers, glasses, ceramics, etc.

99. Quantum cascade laser

Date: 2019-07-02 | ID: 10340662

Abstract: A QCL (10) includes a first electrode (15), a first contact layer (11) that is in contact with the first electrode (15) and is made of a first compound semiconductor, a second electrode (14) having a polarity opposite to that of the first electrode (15), a second contact layer (13) that is in contact with the second electrode (14) and is made of a second compound semiconductor, and an active layer (12) disposed between the first contact layer (11) and the second contact layer (13) and including two or more active layer units. Each of the active layer units includes one or more quantum well layers made of a third compound semiconductor and one or more barrier layers made of a fourth compound semiconductor, and each of the quantum well layers and each of the barrier layers are alternately stacked. The vibrational energies of longitudinal optical phonons of the third compound semiconductor and the fourth compound semiconductor are higher than the vibrational energy of a longitudinal optical phonon of GaAs and lower than or equal to the vibrational energy of a longitudinal optical phonon of AlN.

100. Filter elements, coalescing baffles, filtration vessel and methods

Date: 2019-07-09 | ID: 10343096

Abstract: Improvements to filtration and vessels such as for filtration and coalescing of gas streams are shown. A filter element with a partial treated region and untreated region such as providing different surface energies or other filtration characteristics are provided. Various keying arrangements for compatibility and/or rotational locking are shown between the filtration vessel, a tubular coalescing baffle, and/or filter element. The tubular coalescing baffle also may include non-louvered pore structure, which provides for more even flow in a two stage type filtration vessel to prevent premature exiting and reduction of flow velocities along the second stage, and/or may additionally or alternatively include drainage apertures such as drain slot formed along a gravitational bottom or otherwise to facilitate additional drainage of coalesced liquid as opposed to

letting such liquid be forced through fluid velocity toward the open end of the tubular baffle.

101. Method and system for estimating wear of axially divided tread zones of tire

Date: 2018-06-26 | ID: 10005328

Abstract: A method for estimating wear of each of circumferential tread zones of a tire by the use of a computer is disclosed. A tire model of the tire comprising model's circumferential tread zones is defined. A simulation for running the tire model under rolling conditions for free-rolling, braking, driving and cornering is performed to obtain a first average wear energy of each model's circumferential tread zone under each rolling condition. With respect to a given running pattern of the tire, occurrence frequencies of the respective rolling conditions occurring in the running pattern are defined. For each circumferential tread zone, a second average wear energy of the concerned circumferential tread zone when the tire is run according to the running pattern is calculated such that the first average wear energies under the respective rolling conditions, of the model's circumferential tread zone of the concerned circumferential tread zone are respectively weighted by the occurrence frequencies of the respective rolling conditions. Wear of each circumferential tread zone is estimated based on the calculated second average wear energy of the concerned circumferential tread zone.

102. Photovoltaic device containing a dye-sensitized solar cell

Date: 2018-06-26 | ID: 10008335

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type portions in which at least one of an oxadiazole isomer acts as a -conjugated bridge (spacer), a biphenyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell and in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

103. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-06-26 | ID: 10008357

Abstract: Disclosed herein are a high-voltage generator for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target, and

an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerised tomography. In particular, the high-voltage generator includes a shield electrode electrically connected intermediate of a first voltage multiplier and a second voltage multiplier. The electron beam apparatus includes control photodetectors and photo emitters having a transparent conductive shield arranged therebetween. The rotary vacuum seal includes a pumpable chamber at a position intermediate between high-pressure and low-pressure ends of a bore for a rotating shaft. The rotary target assembly is configured such that when a torque between a bearing housing and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target has a plurality of target plates supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

104. Solar cells with enhanced solar capture

Date: 2018-07-03 | ID: 10014121

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type molecules in which at least one of an oxadiazole group acts as a -conjugated bridge (spacer), a naphthyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell. The dye for use in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

105. Radiation sensor device for high energy photons

Date: 2018-07-03 | ID: 10014165

Abstract: A radiation sensor device is disclosed for use with a radiation source, capable of emitting radiation with photon energies larger than the work function of the target comprising a target plate to be impacted by the radiation to generate photo-electrons, the target plate being electrically isolated from a shielding electrode. The shielding electrode is arranged to collect energy-filtered photo-electrons from the target plate, using an electrostatic barrier for the filtering. The target plate is constructed of a carbon material. A current measurement device is operative to keep the target plate at a preset voltage difference with respect to the

shielding electrode and measure a photo-electron deficit current as a result of radiation impact on the target plate.

106. Inexpensive variable rep-rate source for high-energy, ultrafast lasers

Date: 2018-07-03 | ID: 10014645

Abstract: System for converting relatively long pulses from rep-rate variable ultrafast optical sources to shorter, high-energy pulses suitable for sources in high-energy ultrafast lasers. Fibers with positive group velocity dispersion (GVD) and self phase modulation are advantageously employed with the optical sources. These systems take advantage of the need for higher pulse energies at lower repetition rates so that such sources can be cost effective.

107. De-ghosting of images captured using a capsule camera

Date: 2018-07-03 | ID: 10015372

Abstract: A method of reducing ghost in images captured using a capsule endoscope while travelling in the gastrointestinal (GI) tract. The captured images contain ghost caused by reflections of multiple light sources by capsule housing of the capsule endoscope. The method derive, from the plurality of images, a ghost model comprising multiple ghost coefficients for relating light energies from the multiple light sources for a given image with ghost signals at multiple pixel locations for the given image. De-ghosted images are generated by compensating the plurality of images using estimated ghost signals based on derived ghost coefficients and the light energies from the multiple light sources. The process of deriving, from the plurality of images, the ghost model comprises removing any sensor gamma or any other non-linearity in pixel values of the plurality of images associated with the light energy.

108. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-07-10 | ID: 10020157

Abstract: Disclosed herein are a high-voltage generator for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target, and an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerized tomography. In particular, the high-voltage generator includes a shield electrode electrically connected intermediate of a first voltage multiplier and a second voltage multiplier. The electron beam apparatus includes control photodetectors and photo emitters having a transparent conductive shield arranged therebetween. The rotary vacuum seal includes a pumpable chamber

at a position intermediate between high-pressure and low-pressure ends of a bore for a rotating shaft. The rotary target assembly is configured such that when a torque between a bearing housing and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target has a plurality of target plates supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

109. Simulation systems and methods

Date: 2018-07-17 | ID: 10025892

Abstract: Methods, systems, computer-readable media, and apparatuses for performing, providing, managing, executing, and/or running a spatially-optimized simulation are presented. In one or more embodiments, the spatially-optimized simulation may comprise a plurality of worker modules performing the simulation, a plurality of entities being simulated among the plurality of worker modules, a plurality of bridge modules facilitating communication between workers and an administrative layer including a plurality of chunk modules, at least one receptionist module, and at least one oracle module. The spatially-optimized simulation may be configured to provide a distributed, persistent, fault-tolerant and spatially-optimized simulation environment. In some embodiments, load balancing and fault tolerance may be performed using transfer scores and/or tensile energies determined among the candidates for transferring simulation entities among workers. In some embodiments, the plurality of bridge modules may expose an application programming interface (API) for communicating with the plurality of worker modules.

110. Method and apparatus to digitize pulse shapes from radiation detectors

Date: 2018-07-17 | ID: 10027340

Abstract: A field programmable gate array based multi-channel flash ADC unit combined with a high speed multi-lane data communications channel/Ethernet-like modular intercommunication providing a complete but easily expandable high-speed data acquisition system. This apparatus and method permits high-speed pulse-shape digitalization allowing position resolution imaging of particles having a range of energies and is scalable to achieve the efficient capture of coincident data from large electromagnetic detector arrays.

111. Method for measuring dosage by means of a radiation detector, especially an X-radiation or gamma-radiation detector, used in the spectroscopic mode, and dosage measurement system using said method

Date: 2018-07-24 | ID: 10031239

Abstract: A method for measuring dosage by means of a radiation detector, especially an X-radiation or gamma-radiation detector, used in the spectroscopic mode, and a dosage measurement system using said method. A range of energies and a dose type H is chosen, a radiation detector of a given type is used, spectra measured by the detector are established for various radiations of the given type, the energies of which are within the chosen range and the respective doses of which are known, and from the spectra, a weighting function is established, that is a correspondence between a mean dose increment and a mean energy, deposited into the detector. This enables a person provided with a dosimeter identical to the detector to know at any time the mean absorbed dose rate, expressed in the amount H.

112. Automatic grouping of document objects for reflowed layout

Date: 2018-07-24 | ID: 10031892

Abstract: A method for arranging graphical objects in an electronic document displayed on a screen of a computing device includes calculating a plurality of positions of the graphical objects displayed on a display area of the screen, grouping the graphical objects whose calculated positions are located within a predetermined area of the display area, calculating a reference point of the group based on each position of the grouped graphical objects, reflowing the grouped graphical objects in response to a variation in display of the electronic document, calculating potential energies for the reflowed graphical objects, and displaying the electronic document with the reflowed graphical objects in a layout having the minimum potential energy among the calculated potential energies.

113. Semiconductor optical element, semiconductor laser element, and method for manufacturing semiconductor optical element and semiconductor laser element, and method for manufacturing semiconductor laser module and semiconductor element

Date: 2018-07-24 | ID: 10033154

Abstract: A semiconductor optical element includes a semiconductor layer portion that includes an optical waveguide layer. The semiconductor layer portion contains a first impurity having a function of suppressing atomic vacancy diffusion and a second impurity having a function of promoting atomic vacancy diffusion, between a topmost surface of the semiconductor layer portion and the optical waveguide layer. The semiconductor layer portion includes two or more regions that extend in a deposition direction. At least one of the two or more regions contains both the first impurity and the second impurity. The two or more regions have different degrees of disordering in the optical waveguide layer achieved through atomic vacancy diffusion and different band gap energies of the optical waveguide layer.

114. Systems and methods for providing an ion beam

Date: 2018-08-07 | ID: 10039935

Abstract: Systems for treating a patient using protons include a proton source configured to provide a proton beam having a plurality of proton energies and at least one processor. The at least one processor is configured to control relative movement between the proton beam and the patient in two dimensions, and to control the proton energy distribution to adjust the penetration depth of the protons in the third dimension while maintaining substantially fixed coordinates in the other two dimensions. Such treatment systems allow for shorter treatment times, higher patient throughput, more precise treatment of the desired areas, and less collateral damage to healthy tissue.

115. Human auditory system modeling with masking energy adaptation

Date: 2018-08-07 | ID: 10043527

Abstract: A method for generating a psychoacoustic model from an audio signal transforms a block of samples of an audio signal into a frequency spectrum comprising frequency components. From this frequency spectrum, it derives group masking energies. These group masking energies each correspond to a group of neighboring frequency components in the frequency spectrum. For a group of frequency components, the method allocates the group masking energy to the frequency components in the group in proportion to energy of the frequency components within the group to provide adapted mask energies for the frequency components within the group, the adapted mask energies providing masking thresholds for the psychoacoustic model of the audio signal.

116. Internally-heated thermal and externally-cool photovoltaic cascade solar energy system for full solar spectrum utilization

Date: 2018-08-07 | ID: 10043932

Abstract: A single-stack, solar power receiver comprising both a thermal absorber layer and a photovoltaic cell layer. The stack includes an aerogel layer, that is optically transparent and thermally insulating (OTTI); a spectrally selective high thermal conductivity (SSTC) thermal absorber layer; a bottom OTTI layer; and a PV cell layer. The SSTC layer includes a set of fins that substantially blocks solar radiation absorption in the band where PV cells are most sensitive. Photons with energies above or below this band block range are absorbed by the fins and the absorbed heat is conducted to pipes in the fin structure carrying a heated thermal working fluid to heat storage. Photons with energy in the band block range are reflected by the SSTC fins to the PV cell layer. The bottom OTTI aerogel layer keeps the PV cell operating near ambient temperature. The PV cell converts incident solar radiation to electrical energy.

117. Laser repetition rate multiplier and flat-top beam profile generators using mirrors and/or prisms

Date: 2018-08-07 | ID: 10044164

Abstract: A repetition rate (pulse) multiplier includes one or more beam splitters and prisms forming one or more ring cavities with different optical path lengths that delay parts of the energy of each pulse. A series of input laser pulses circulate in the ring cavities and part of the energy of each pulse leaves the system after traversing the shorter cavity path, while another part of the energy leaves the system after traversing the longer cavity path, and/or a combination of both cavity paths. By proper choice of the ring cavity optical path length, the repetition rate of an output series of laser pulses can be made to be a multiple of the input repetition rate. The relative energies of the output pulses can be controlled by choosing the transmission and reflection coefficients of the beam splitters. Some embodiments generate a time-averaged output beam profile that is substantially flat in one dimension.

118. System, apparatus and method for clean, multi-energy generation

Date: 2018-09-04 | ID: 10066556

Abstract: Systems, apparatuses and methods in interoperating with multiple clean energy sources, such as pneumatic energy, electrical energy, hydrogen energy and steam energy, with engine configurations employing these clean energy sources dynamically and synchronously. Further embodiments including fossil fuel energies.

119. Ion mass separation using RF extraction

Date: 2018-09-04 | ID: 10068758

Abstract: An apparatus which has the capability of filtering unwanted species from an extracted ion beam without the use of a mass analyzer magnet is disclosed. The apparatus includes an ion source having chamber walls that are biased by an RF voltage. The use of RF extraction causes ions to exit the ion source at different energies, where the energy of each ion species is related to its mass. The extracted ion beam can then be filtered using only electrostatic energy filters to eliminate the unwanted species. The electrostatic energy filter may act as a high pass filter, allowing ions having an energy above a certain threshold to reach the workpiece. Alternatively, the electrostatic energy filter may act as a low pass filter, allowing ions having an energy below a certain threshold to reach the workpiece. In another embodiment, the electrostatic energy filter operates as a bandpass filter.

120. Semiconductor optical element, semiconductor laser element, and method for

manufacturing semiconductor optical element and semiconductor laser element, and method for manufacturing semiconductor laser module and semiconductor element

Date: 2018-09-04 | ID: 10069280

Abstract: A semiconductor optical element includes a semiconductor layer portion that includes an optical waveguide layer. The semiconductor layer portion contains a first impurity having a function of suppressing atomic vacancy diffusion and a second impurity having a function of promoting atomic vacancy diffusion, between a topmost surface of the semiconductor layer portion and the optical waveguide layer. The semiconductor layer portion includes two or more regions that extend in a deposition direction with different contents of at least one of the impurities. At least one of the two or more regions contains both the first impurity and the second impurity. The two or more regions have different degrees of disordering in the optical waveguide layer achieved through atomic vacancy diffusion and different band gap energies of the optical waveguide layer.

121. Ophthalmic treatment apparatus and beam control method therefor

Date: 2018-09-25 | ID: 10080683

Abstract: The present invention relates to an ophthalmic treatment apparatus and to a beam control method therefor. The ophthalmic treatment apparatus according to the present invention comprises: a beam generating unit for generating beams having different pulse energies; a bubble sensing unit for sensing whether or not bubbles have been generated, as well as the amount of generated bubbles, on the basis of the pulse energy of the beam generated by the beam generating unit and radiated onto the treatment region of an eyeball; and a control unit for controlling the operation of the beam generating unit such that the pulse energy of the beam generated by the beam generating unit can be adjusted in accordance with the signal from the bubble sensing unit.

122. Ultra-responsive phase shifters for depletion mode silicon modulators

Date: 2018-09-25 | ID: 10082686

Abstract: A novel phase shifter design for carrier depletion based silicon modulators, based on an experimentally validated model, is described. It is believed that the heretofore neglected effect of incomplete ionization will have a significant impact on ultra-responsive phase shifters. A low VL product of 0.3 V·cm associated with a low propagation loss of 20 dB/cm is expected to be observed. The phase shifter is based on overlapping implantation steps, where the doses and energies are carefully chosen to utilize counter-doping to produce an S-shaped junction. This junction has a particularly attractive VL figure of merit, while simultaneously achieving attractively low capacitance and optical loss. This improvement will enable

significantly smaller Mach-Zehnder modulators to be constructed that nonetheless would have low drive voltages, with substantial decreases in insertion loss. The described fabrication process is of minimal complexity; in particular, no high-resolution lithographic step is required.

123. Systems and methods using optical amplifiers

Date: 2018-09-25 | ID: 10084283

Abstract: An optical system is described. The optical system has an optical amplifier array. The optical amplifier array has an array of optical amplifiers. Each optical amplifier has an optical amplifier region including a semiconductor active region having a direct electronic band gap with a conduction band edge. The semiconductor active region is embedded within a photonic crystal having an electromagnetic band gap having photon energies overlapping the energy of the conduction band edge of the electronic band gap such that spontaneous emission of photons in the semiconductor active region is suppressed.

124. Method for energy calibration of a pulsed cutting laser for eye surgery

Date: 2018-10-02 | ID: 10086470

Abstract: A method for energy calibration of a pulsed cutting laser for eye surgery comprises irradiating a sample material with a plurality of sets of laser pulses of the cutting laser with pulse energies differing from set to set. This method also comprises analyzing at least one visually perceptible discoloration structure created in the sample material as a result of the irradiation, selecting the pulse energy of one of the sets based on the analysis, and setting a treatment pulse energy for the cutting laser based on the selected energy.

125. Low dielectric constant (low-k) dielectric and method of forming the same

Date: 2018-10-02 | ID: 10090150

Abstract: A method of forming a low dielectric constant (low-k) dielectric is disclosed. The method includes providing a substrate and forming a dielectric including porogens over the substrate. While subjecting the dielectric to a first pressure, the dielectric is exposed to ultraviolet (UV) radiation. The dielectric is also subject to a second pressure less than 1×10^3 Torr. While subjecting the dielectric to the second pressure, the dielectric is exposed to vacuum UV (VUV) radiation having one or more photon energies greater than 7 eV. Since it is difficult for VUV radiation to travel through a medium at a pressure greater than 10 Torr without being absorbed by intermittent materials, subjecting the dielectric to the second pressure creates a medium wherein the dielectric can be exposed to the VUV radiation. By exposing the dielectric to UV and VUV radiation, the dielectric can achieve a reduced dielectric constant and increased mechanical properties.

126. Dose aspects of radiation therapy planning and treatment

Date: 2018-10-09 | ID: 10092774

Abstract: Radiation treatment planning includes accessing values of parameters such as a number of beams to be directed into sub-volumes in a target, beam directions, and beam energies. Information that specifies limits for the radiation treatment plan are accessed. The limits include a limit on irradiation time for each sub-volume outside the target. Other limits can include a limit on irradiation time for each sub-volume in the target, a limit on dose rate for each sub-volume in the target, and a limit on dose rate for each sub-volume outside the target. The values of the parameters are adjusted until the irradiation time for each sub-volume outside the target satisfies the maximum limit on irradiation time.

127. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-10-09 | ID: 10096446

Abstract: Disclosed herein are a high-voltage generator (120) for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target (500), and an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerized tomography. In particular, the high-voltage generator includes a shield electrode (123a, 123b) electrically connected intermediate of a first voltage multiplier (122a, 122b) and a second voltage multiplier (122b, 122c). The electron beam apparatus includes control photodetectors (202a, 202b not shown) and photo emitters (201a, 202a) having a transparent conductive shield (203a and 203b, 203c not shown) arranged therebetween. The rotary vacuum seal includes a pumpable chamber (302) at a position intermediate between high-pressure and low-pressure ends of a bore (301) for a rotating shaft (401). The rotary target assembly is configured such that when a torque between a bearing housing (403) and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target (500) has a plurality of target plates (560) supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode (123a) maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

128. All-fiber chirped pulse amplification systems

Date: 2018-10-09 | ID: 10096962

Abstract: By compensating polarization mode-dispersion as well chromatic dispersion in photonic crystal fiber

pulse compressors, high pulse energies can be obtained from all-fiber chirped pulse amplification systems. By inducing third-order dispersion in fiber amplifiers via self-phase modulation, the third-order chromatic dispersion from bulk grating pulse compressors can be compensated and the pulse quality of hybrid fiber/bulk chirped pulse amplification systems can be improved. Finally, by amplifying positively chirped pulses in negative dispersion fiber amplifiers, a low noise wavelength tunable seed source via anti-Stokes frequency shifting can be obtained.

129. Pulse slicer in laser systems

Date: 2018-10-09 | ID: 10096963

Abstract: An apparatus (such as a laser-based system) and method for providing optical pulses in a broad range of pulse widths and pulse energies uses a pulse slicer which is configured to slice a predefined portion having a desired pulse width of each of the one or more output optical pulses from a laser oscillator, in which timings of a rising edge and a falling edge of each sliced optical pulse relative to a time instance of a maximum of the corresponding each of the one or more output optical pulses from the laser oscillator, are chosen at least to maximize amplification efficiency of the optical amplifier, which may be located after the pulse slicer, and to provide the one or more amplified output optical pulses each having the desired pulse energy and pulse width.

130. Nano particle detection with X-ray capsule

Date: 2018-10-16 | ID: 10098599

Abstract: A colon imaging system, including an imaging capsule, having: a. a radiation source providing X-Ray and gamma radiation with energies sufficient to induce X-Ray fluorescence from nanoparticles that adhere to cancerous tissue, and which were administered to a patient in a solution prior to examining the colon with the imaging capsule; b. a detector for detecting particle energy of particles emitted responsive to the provided radiation and forming count information disclosing a number of particles detected for each energy level; c. a transceiver for transferring the count information to an external computer for analysis, and also having a computer for constructing images of an inside of the colon based on the count information; wherein the images provide an indication of locations in the colon of which the nanoparticles adhere to.

131. X-ray source, high-voltage generator, electron beam gun, rotary target assembly, rotary target, and rotary vacuum seal

Date: 2018-10-16 | ID: 10102997

Abstract: Disclosed herein are a high-voltage generator for an x-ray source, an x-ray gun, an electron beam apparatus, a rotary vacuum seal, a target assembly for an x-ray source, a rotary x-ray emission target, and

an x-ray source. These various aspects may separately and/or together enable the construction of an x-ray source which can operate at energies of up to 500 kV and beyond, which is suitable for use in commercial and research x-ray applications such as computerized tomography. In particular, the high-voltage generator includes a shield electrode electrically connected intermediate of a first voltage multiplier and a second voltage multiplier. The electron beam apparatus includes control photodetectors and photo emitters having a transparent conductive shield arranged therebetween. The rotary vacuum seal includes a pumpable chamber at a position intermediate between high-pressure and low-pressure ends of a bore for a rotating shaft. The rotary target assembly is configured such that when a torque between a bearing housing and a vacuum housing exceeds a predetermined torque, the bearing housing rotates relative to the vacuum housing. The rotary x-ray emission target has a plurality of target plates supported on a hub, the plates being arranged on the hub to provide an annular target region about an axis rotation of the hub. The x-ray gun is provided with a shield electrode maintained at a potential difference relative to the x-ray target different to the electron beam emission cathode.

132. Method of forming a multi-layered coating with columnar microstructure and branched columnar microstructure

Date: 2018-10-23 | ID: 10106882

Abstract: A method includes forming a multi-layered ceramic barrier coating under a chamber pressure of greater than 1 Pascals. In the method, low- and high-dopant ceramic materials are evaporated using input evaporating energies that fall, respectively, above and below a threshold for depositing the materials in a columnar microstructure (low-dopant) and in a branched columnar microstructure (high-dopant).

133. Optical modulator

Date: 2018-11-06 | ID: 10120212

Abstract: A novel phase shifter design for carrier depletion based silicon modulators, based on an experimentally validated model, is described. It is believed that the heretofore neglected effect of incomplete ionization will have a significant impact on ultra-responsive phase shifters. A low VL product of 0.3V·cm associated with a low propagation loss of 20 dB/cm is expected to be observed. The phase shifter is based on overlapping implantation steps, where the doses and energies are carefully chosen to utilize counter-doping to produce an S-shaped junction. This junction has a particularly attractive VL figure of merit, while simultaneously achieving attractively low capacitance and optical loss. This improvement will enable significantly smaller Mach-Zehnder modulators to be constructed that nonetheless would have low drive voltages, with substantial decreases in insertion loss. The described fabrication process is of minimal

complexity; in particular, no high-resolution lithographic step is required.

134. Beam shaping assembly for neutron capture therapy

Date: 2018-11-13 | ID: 10124192

Abstract: A beam shaping assembly for neutron capture therapy includes a beam inlet, a target having nuclear reaction with an incident proton beam from the beam inlet to produce neutrons forming a neutron beam defining a main axis, a moderator adjoining to the target, a reflector surrounding the moderator, a thermal neutron absorber adjoining to the moderator, a radiation shield arranged inside the beam shaping assembly and a beam outlet. The neutrons are moderated to epithermal neutron energies. The reflector leads the neutrons deviated from the main axis back, and a gap channel is arranged between the moderator and the reflector. The thermal neutron absorber is used for absorbing thermal neutrons so as to avoid overdosing in superficial normal tissue during therapy. The radiation shield is used for shielding leaking neutrons and photons so as to reduce dose of the normal tissue not exposed to irradiation.

135. Method of simulating formation of lithography features by self-assembly of block copolymers

Date: 2018-11-13 | ID: 10127336

Abstract: A method of determining an uncertainty in the position of a domain within a self-assembly block copolymer (BCP) feature. The method includes simulating a BCP feature, calculating a minimum energy position of a first domain within the simulated BCP feature, simulating the application of a potential that causes the position of the first domain to be displaced from the minimum energy position, simulating release of the potential back toward the minimum energy, recording a plurality of energies of the BCP feature during the release and recording at each of the plurality of energies a displacement of the first domain from the minimum energy position, calculating, from the recorded energies and recorded displacements, a probability distribution indicating a probability of the first domain being displaced from the minimum energy position, and, from the probability distribution, calculating an uncertainty in the position of the first domain within the BCP feature.

136. Three-dimensional imaging in charged-particle microscopy

Date: 2018-11-13 | ID: 10128080

Abstract: A method of investigating a specimen using charged-particle microscopy, and a charged particle microscope configured for same. In one embodiment, the method includes: (a) selecting a virtual sampling grid on a surface of a specimen, the virtual sampling grid extending in an XY plane and comprising nodes to be impinged upon by a beam of charged particles; (b) selecting a landing energy for the beam, the landing

energy associated with a penetration depth; (c) generating a scan image by irradiating the specimen at each of the nodes with the beam, and detecting output radiation emanating from the specimen in response thereto; (d) repeating steps (b) and (c) for a series of different landing energies corresponding to an associated series of penetration depths, (e) pre-selecting an energy increment by which the landing energy is to be altered after a first iteration of steps (b) and (c); (f) associating the energy increment with a corresponding depth increment; (g) selecting the virtual sampling grid to have a substantially equal node pitch p in X and Y , which pitch p is matched to the value of the depth increment so as to produce a substantially cubic sampling voxel; and (h) selecting subsequent energy values in the series of landing energies so as to maintain a substantially constant depth increment between consecutive members of the series of penetration depths.

137. Layer structure for a group-III-nitride normally-off transistor

Date: 2018-11-13 | ID: 10128362

Abstract: A layer structure for a normally-off transistor has an electron-supply layer made of a group-III-nitride material, a back-barrier layer made of a group-III-nitride material, a channel layer between the electron-supply layer and the back-barrier layer, made of a group-III-nitride material having a band-gap energy that is lower than the band-gap energies of the other layer mentioned. The material of the back-barrier layer is of p-type conductivity, while the material of the electron-supply layer and the material of the channel layer are not of p-type conductivity, the band-gap energy of the electron-supply layer is smaller than the band-gap energy of the back-barrier layer. In absence of an external voltage a lower conduction-band-edge of the third group-III-nitride material in the channel layer is higher in energy than a Fermi level of the material in the channel layer.

138. Generation of VUV, EUV, and X-ray light using VUV-UV-VIS lasers

Date: 2018-11-13 | ID: 10128631

Abstract: A method for extending and enhancing bright coherent high-order harmonic generation into the VUV-EUV-X-ray regions of the spectrum involves a way of accomplishing phase matching or effective phase matching of extreme upconversion of laser light at high conversion efficiency, approaching 10³ in some spectral regions, and at significantly higher photon energies in a waveguide geometry, in a self-guiding geometry, a gas cell, or a loosely focusing geometry, containing nonlinear medium. The extension and enhancement of the coherent VUV, EUV, X-ray emission to high photon energies relies on using VUV-UV-VIS lasers of shorter wavelength. This leads to enhancement of macroscopic phase matching parameters due to stronger contribution of linear and nonlinear dispersion of both atoms and ions, combined with a strong microscopic single-atom yield.

139. Apparatus of plural charged-particle beams

Date: 2018-11-27 | ID: 10141160

Abstract: A secondary projection imaging system in a multi-beam apparatus is proposed, which makes the secondary electron detection with high collection efficiency and low cross-talk. The system employs one zoom lens, one projection lens and one anti-scanning deflection unit. The zoom lens and the projection lens respectively perform the zoom function and the anti-rotating function to remain the total imaging magnification and the total image rotation with respect to the landing energies and/or the currents of the plural primary beamlets. The anti-scanning deflection unit performs the anti-scanning function to eliminate the dynamic image displacement due to the deflection scanning of the plural primary beamlets.

140. Power amplifier adjustment for transmit beamforming in multi-antenna wireless systems

Date: 2018-11-27 | ID: 10141997

Abstract: One or more beamsteering matrices are applied to one or more signals to be transmitted via multiple antennas. After the one or more beamsteering matrices are applied to the one or more signals, the plurality of signals is provided to a plurality of power amplifiers coupled to the multiple antennas. Signal energies are determined for the plurality of signals provided to the plurality of power amplifiers, and relative signal energies are determined based on the determined signal energies. Output power levels of the plurality of power amplifiers are adjusted based on the determined relative signal energies.

141. Audio signal processing

Date: 2018-11-27 | ID: 10142763

Abstract: Embodiments of the present invention relate to audio signal processing. Specifically, a method for processing audio signal is provided, the method comprising: determining, for a current frame of the audio signal, frequency band energies for a plurality of predefined frequency bands at least partially based on frequency parameters of the current frame; generating frequency band gains for the plurality of predefined frequency bands by processing the frequency band energies; and generating frequency bin gains for the current frame based on the frequency band gains using predefined frequency band filter banks, the frequency band filter banks being specific to the plurality of predefined frequency bands. Corresponding system and computer program product are also disclosed.

142. Linear fitting of multi-threshold counting data

Date: 2018-12-04 | ID: 10145968

Abstract: The present disclosure provides a system and method for efficiently mining multi-threshold measurements acquired using photon counting pixel-array detectors for spectral imaging and diffraction

analyses. Images of X-ray intensity as a function of X-ray energy were recorded on a 6 megapixel X-ray photon counting array detector through linear fitting of the measured counts recorded as a function of counting threshold. An analytical model is disclosed for describing the probability density of detected voltage, utilizing fractional photon counting to account for edge/corner effects from voltage plumes that spread across multiple pixels. Three-parameter fits to the model were independently performed for each pixel in the array for X-ray scattering images acquired for 13.5 keV and 15.0 keV X-ray energies. From the established pixel responses, multi-threshold composite images produced from the sum of 13.5 keV and 15.0 keV data can be analytically separated to recover the monochromatic images through simple linear fitting.

143. Spectral CT

Date: 2018-12-04 | ID: 10147168

Abstract: Aspects include estimating structure models for a voxel(s) of a spectral image. The estimation is based on a noise model. Aspects further include fitting structure models to a 3D neighborhood about the voxel(s), selecting one of the structure models for the voxel(s) which is based on the fittings and predetermined model selection criteria. Aspects further include de-noising the voxel(s) based on the selected structure model, which produces a set of de-noised spectral images. Other aspects include generating a virtual contrast enhanced intermediate image for each energy image of a set of spectral images. The energies correspond to different energy ranges which are based on de-noised spectral images, decomposed de-noised spectral images, an iodine map, and a contrast enhancement factor. Aspects further include generating final virtual contrast enhanced images. The final virtual contrast enhanced images are generated by incorporating a simulated partial volume effect with the intermediate virtual contrast enhanced images.

144. Induced-flow wind power system

Date: 2018-12-25 | ID: 10161382

Abstract: A high efficiency induced-flow wind power system engages and converts both potential (to-pull) and kinetic (to-push) wind energies to effective airflow power, delivering induced (accelerated) airflow power in a controlled flow field to a turbine/rotor, impelling a 360-degree torque on the turbine/rotor and, as a result, extracting (converting) more than 80% of the combined effective wind power to mechanical power. The induced push-pull effect results in higher efficiency wind-to-mechanical power extraction (conversion). The induced-flow wind power system can be coupled with (i) an electrical generator, inverter/converter for generating AC and DC power, (ii) pressurized vessel for effective energy storage (iii) a pressurized structure, such as an air supported structure, to ensure its structural integrity. The Induced-Flow Wind System embodiment comprises: a passive-flow nozzle, an active-flow nozzles and a turbine encased in housing interposed within the flow field of the active-flow nozzle and coupled with an electrical generator or a

compressor.

145. Photovoltaic device having an electrically conductive transparent substrate and light absorbing compound

Date: 2018-12-25 | ID: 10163578

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type portions in which at least one of an oxadiazole isomer acts as a -conjugated bridge (spacer), a biphenyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell and in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

146. Light emission module with enhanced control in particular for a motor vehicle

Date: 2018-12-25 | ID: 10165641

Abstract: A light emission module, in particular for a motor vehicle. The module includes a substrate comprising a curved main portion extending in a longitudinal direction. A plurality of electroluminescent elements is arranged on the substrate and configured to emit light rays when supplied with electrical energy. The electroluminescent elements are distributed along the longitudinal direction, and a control assembly suitable for regulating the electrical energy supplied to the electroluminescent elements. The control assembly has a mode of operation in which the control assembly is configured to supply the electroluminescent elements with respective electrical energies and/or powers determined at least as a function of respective main directions of light emission of the electroluminescent elements to obtain at least two maximum light intensities emitted by the electroluminescent elements in the corresponding main direction of emission which are different along the longitudinal direction of the substrate.

147. Dye sensitized photoelectric conversion device

Date: 2019-01-01 | ID: 10170250

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type molecules in which at least one of an oxadiazole group acts as a -conjugated bridge (spacer), a naphthyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the

-conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell. The dye for use in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

148. Method for heat treating a tool

Date: 2019-01-08 | ID: 10173283

Abstract: A method for heat treating a hand tool wherein generally conical or pyramidal shaped laser beams are generated and have respective apexes or focal points of different thermal energies operably disposed with respect to differently configured portions and masses of the hand tool for simultaneous different effective heat treatment.

149. Li-ion battery capacity and voltage prediction using quantum simulations

Date: 2019-01-08 | ID: 10177398

Abstract: Provided are methods and computer programs for predicting lithium battery properties. One method includes operations for selecting candidate structures for the battery, and for obtaining a plurality of delithiated structures of the candidate structures with different lithium concentrations. The quantum mechanical (QM) energies of the delithiated structures are calculated, and a functional form is developed to obtain the voltage of the lithium battery. The functional form is a function of the lithium concentration and is based on the QM energies of the delithiated structures. Further, the capacity of the lithium battery is calculated based on a selected lithium concentration, where the functional form returns a cut-off voltage of the lithium battery when the lithium concentration is equal to the selected lithium concentration.

150. Strain-control heterostructure growth

Date: 2019-01-15 | ID: 10181398

Abstract: A solution for fabricating a group III nitride heterostructure and/or a corresponding device is provided. The heterostructure can include a nucleation layer, which can be grown on a lattice mismatched substrate using a set of nucleation layer growth parameters. An aluminum nitride layer can be grown on the nucleation layer using a set of aluminum nitride layer growth parameters. The respective growth parameters can be configured to result in a target type and level of strain in the aluminum nitride layer that is conducive for growth of additional heterostructure layers resulting in strains and strain energies not exceeding threshold values which can cause relaxation and/or dislocation formation.

151. Delivery of audio and tactile stimulation therapy for animals and humans

Date: 2019-01-22 | ID: 10182964

Abstract: A system for providing a therapeutic treatment to a mammal for a selected mammalian condition includes a wearable member configured for use about an upper torso of a mammal and an energy module configured to generate energy waves in an energy range particularly configured to provide a stimulation that is therapeutically effective treatment for the selected mammalian condition. The energy module is adapted to be supported by the wearable member about the upper torso of the mammal. The wearable member also includes a therapy delivery portion configured to position the energy module at a treatment site about the upper torso. The underlying idea of the teachings herein is to deliver non-invasive, non-electrical-inducing therapies and energies such as vibroacoustic, physioacoustic, kinesitherapy and phototherapy, through wearable and non-wearable apparatuses to animals and humans for therapeutic treatment.

152. Batch-processing method for super-high aspect ratio diffractive optics

Date: 2019-01-22 | ID: 10183375

Abstract: A method for fabrication of diffractive optics by batch processing is disclosed, having applicability to high resolution ultra-high aspect ratio Fresnel Zone Plates for focusing of X-rays or gamma-rays having energies up to hundreds of keV. An array of precursor forms is etched into a planar substrate. Sidewalls of the forms are smoothed to a required surface roughness. A sequence of alternating layers of different complex refractive index, for binary or higher order diffractive optics, are deposited on the precursor forms by atomic layer deposition (ALD), to provide diffractive line patterns. Thinnest layers may have nanometer thicknesses. After front surface planarization and thinning of the substrate to expose first and second surfaces of the diffractive line patterns of the diffractive optic, the height h in the propagation direction provides a designed absorption difference and/or phase shift difference between adjacent diffractive lines. Optionally, post-processing enhances mechanical, thermal, electrical and optical properties.

153. Stamping method and components produced thereby

Date: 2019-01-29 | ID: 10189384

Abstract: A method for producing vehicle seat components involves working a semifinished blank in a cutting manner. The method can be carried out easily and at low cost and makes it possible to produce components that require little reworking and also provides a vehicle seat component that is both suitable for reducing crash energies by deformation and has an adequate wear resistance. The method includes local heating of the semifinished blank in the region of an intended cutting line of the vehicle seat components to be cut out and cutting out the vehicle seat components from the semifinished blank along the cutting line during or

shortly after the heating.

154. Methods for operating electrostatic trap mass analyzers

Date: 2019-01-29 | ID: 10192730

Abstract: A method of operating an electrostatic trapping mass analyzer, comprising: introducing a sample of ions into a trapping region of the mass analyzer, wherein a trapping field within the trapping region is such that the ions exhibit radial motion with respect to a central longitudinal axis of the trapping region while undergoing harmonic motion in a dimension defined by the central longitudinal axis, the frequency of harmonic motion of a particular ion being a function of its mass-to-charge ratio; superimposing a modulation field onto the trapping field within the trapping region, the modulation field acting to either increase or reduce the harmonic motion energies of the ions by an amount varying according to the frequency of harmonic motion; and acquiring a mass spectrum of the ions in the trapping region by measuring a signal representative of an image current induced by the harmonic motion of the ions.

155. Organic light-emitting device having delayed fluorescence

Date: 2019-01-29 | ID: 10193094

Abstract: The present application relates to an organic electroluminescent device (OLED) which has an emitting layer comprising a compound having a small difference between the energies of the S1 and T1 states, and in which certain conditions apply to the HOMO and LUMO energy levels of the emitting layer and the layers between the anode and the emitting layer.

156. Bandwidth reduction with beamforming and data compression

Date: 2019-01-29 | ID: 10194441

Abstract: Described are techniques for limiting bandwidth requirements for user equipment UE data sent on a front haul link between a remote radio head RRH and a baseband unit BBU. For a given UE a subset of a plurality of beams is selected based on received energies of the plurality of beams, and for the given UE only data from the selected subset of beams transmitting on a front haul link. Multiple techniques are detailed for how the subset is selected, including (when UE allocation information is available) averaged received beam energy, total received beam energy, maximum received beam energy and also (when UE allocation information is not available). For further bandwidth reduction a special data compression technique uses the received energies of each beam to select a minimum gain offset value after dividing the data into I and Q components.

157. Laser spot tracking receiver

Date: 2019-02-05 | ID: 10197677

Abstract: A technique for is presented for locating at least one object illuminated by a laser designator. A detector and an optical unit are provided. The one optical unit is configured for receiving a beam of laser light scattered by the at least one object being illuminated by the laser designator, for creating two secondary beams, and for focusing the two secondary beams to respective foci along an optical axis of the at least one optical unit. The detector is located between the two foci, divided into an even number of portions, and is configured for measuring an intensity of impinging light at each portion. The optical unit is configured for causing the received laser light to impinge the detector, such that an upright image and an inverted image of the scattered laser light beam having substantially equal sizes and substantially equal energies are projected on the detector.

158. Method for autonomous self-blanking by radiation portal monitors to minimize the interference from pulsed X-rays radiation

Date: 2019-02-05 | ID: 10197700

Abstract: A system and associated method for isolating intended radiation signals for determining target characteristics includes multiple detectors for detecting radiation signals having varying energies, delay modules for delaying the detected radiation signals and a discriminator associated with the multiple detectors for determining if detected radiation signals include unintended radiation signals, e.g., x-rays, and provided blanking signals to a switch in order to effectively remove the unintended radiation signals from the data that is presented to the processor for determining target characteristics.

159. Differentiating a flow rate error and a dynamic error of an exhaust gas recirculation system

Date: 2019-02-12 | ID: 10202915

Abstract: A method and a computer program for recognizing and differentiating a flow rate error and a dynamic error of an exhaust gas recirculation system (EGR) of an internal combustion engine. Measured and modeled EGR mass flow signals are each subjected to bandpass filtering using time constants optimized for determining flow rate errors and bandpass filtering using time constants optimized for determining dynamic errors. The energy is determined for each of the filtered signals and an energy quotient is computed between the energies of the signals filtered for dynamic errors and the signals filtered for flow rate errors. A dynamic error and a flow rate error of the exhaust gas recirculation may be recognized and differentiated from one another on the basis of the energy quotients.

160. LMFP cathode materials with improved electrochemical performance

Date: 2019-02-12 | ID: 10205158

Abstract: Particulate LMFP cathode materials having high manganese contents and small amounts of dopant metals are disclosed. These cathode materials are made by milling a mixture of precursor materials in a wet or dry milling process. Preferably, off-stoichiometric amounts of starting materials are used to make the cathode materials. Unlike other high manganese LMFP materials, these cathode materials provide high specific capacities, very good cycle life and high energies even at high discharge rates.

161. Compensation for overlapping scan lines in a scanning-beam display system

Date: 2019-02-26 | ID: 10218947

Abstract: A display system includes a display screen, a plurality of subsystems, and a control system. The plurality of subsystems each generate an excitation beam that carries image information and a servo beam. For each subsystem, a servo feedback detector receives feedback light of the servo beam, detects the servo feedback mark, and produces a monitor signal. For each subsystem, a control unit is operable to adjust optical energies carried by the excitation beam using a scaling factor. Two adjacent subsystems of the plurality of subsystems are configured such that in operation the areas scanned by the excitation beams of the two subsystems overlap in an overlap region. The control system is configured to determine a range of the overlap region based on the monitor signals from the servo feedback detectors of the adjacent subsystems, and to determine the scaling factors for the excitation beams for the overlap region.

162. Multi-photon absorption for femtosecond micromachining and refractive index modification of tissues

Date: 2019-03-12 | ID: 10226381

Abstract: By adapting femtosecond micromachining approaches developed in hydrogels, we can perform Intra-tissue Refractive Index Shaping (IRIS) in biological tissues. We reduced femtosecond laser pulse energies below the optical breakdown thresholds to create grating patterns that are associated with a change in the refractive index of the tissue. To increase two-photon absorption, we used a two (or more)-photon-absorbing chromophore.

163. Thermal processing with line beams

Date: 2019-03-12 | ID: 10226837

Abstract: Multi-beam, multi-wavelength processing systems include two or more lasers configured to provide respective beams to a substrate. The beams have wavelengths, pulse durations, beam areas, beam

intensities, pulse energies, polarizations, repetition rates, and other beam properties that are independently selectable. Substrate distortion in processes requiring local heating can be reduced by preheating with a large area beam at a first wavelength followed by exposure to a focused beam at a second wavelength so as to heat a local area to a desired process temperature. For some processing, multiple wavelengths are selected to obtain a desired energy deposition within a substrate.

164. Mass spectrometer with laser system for producing photons of different energies

Date: 2019-03-19 | ID: 10236173

Abstract: The invention relates to mass spectrometers with optically pumped lasers, whose laser light can be used for ionization by laser desorption, for the fragmentation of ions by photodissociation (PD), for the initiation of ion reactions, and for other purposes. The invention provides a laser system for a mass spectrometer, with which at least two laser beams of different wavelengths can be generated for use at different points along an ion path from an ion source to an ion detector in the mass spectrometer.

165. Rotating high-density fusion reactor for aneutronic and neutronic fusion

Date: 2019-04-09 | ID: 10255998

Abstract: A fusion device produces fusion of neutral atoms and ions in an aneutronic fusion manner without neutrons as products utilizes strong ion-neutral coupling at high neutral densities. Ions and neutrals rotate together in a cylindrical chamber due to frequent collisions. High magnetic forces make the attainment of high rotation energy possible; the magnetic field in a medium can be set at very high values because of the absence of magnetic charges. The repeated acceleration by strong magnetic forces in the azimuthal direction makes possible very high ion velocity. Fusion takes place mainly between neutral particles. This approach can be applied to fusion with neutrons as well. Conventional fusion schemes and neutron sources can be realized using the principles described above in the generation of neutrals of high energies and densities.

166. Apparatus and method for decoding or encoding an audio signal using energy information values for a reconstruction band

Date: 2019-04-30 | ID: 10276183

Abstract: An apparatus for decoding an encoded audio signal having an encoded representation of a first set of first spectral portions and an encoded representation of parametric data indicating spectral energies for a second set of second spectral portions, has: an audio decoder for decoding the encoded representation of the first set of the first spectral portions to obtain a first set of first spectral portions and for decoding the encoded representation of the parametric data to obtain a decoded parametric data for the second set of second spectral portions indicating, for individual reconstruction bands, individual energies; a frequency

regenerator for reconstructing spectral values in a reconstruction band having a second spectral portion using a first spectral portion of the first set of the first spectral portions and an individual energy for the reconstruction band, the reconstruction band having a first spectral portion and the second spectral portion.

167. Semiconductor device including superjunction structure formed using angled implant process

Date: 2019-04-30 | ID: 10276387

Abstract: A semiconductor device includes a superjunction structure formed using simultaneous N and P angled implants into the sidewall of a trench. The simultaneous N and P angled implants use different implant energies and dopants of different diffusion rate so that after annealing, alternating N and P thin semiconductor regions are formed. The alternating N and P thin semiconductor regions form a superjunction structure where a balanced space charge region is formed to enhance the breakdown voltage characteristic of the semiconductor device.

168. Neutron detector and dose rate meter using beryllium-loaded materials

Date: 2019-05-07 | ID: 10281600

Abstract: An apparatus and method for improving the sensitivity and energy response of neutron detectors and neutron dose rate meters. A beryllium layer is added to neutron detector moderators to improve the sensitivity of the detector. Energy dependence of the sensitivity is optimized by controlling the amount of beryllium in the moderator and by specifying the geometrical design parameters. The beryllium layer, in combination with additional material layers in the moderator, makes the detector response function correspond to the theoretical one in a wide range of energies. Response parameters of the neutron dose rate meter are within 20% of the theoretical response function in the neutron energy range from 500 keV to 10 GeV, and also in the energy range corresponding to thermal neutrons (about 1-100 meV).

169. Processing of audio signals during high frequency reconstruction

Date: 2019-05-07 | ID: 10283122

Abstract: The application relates to HFR (High Frequency Reconstruction/Regeneration) of audio signals. In particular, the application relates to a method and system for performing HFR of audio signals having large variations in energy level across the low frequency range which is used to reconstruct the high frequencies of the audio signal. A system configured to generate a plurality of high frequency subband signals covering a high frequency interval from a plurality of low frequency subband signals is described. The system comprises means for receiving the plurality of low frequency subband signals; means for receiving a set of target energies, each target energy covering a different target interval within the high frequency interval and being

indicative of the desired energy of one or more high frequency subband signals lying within the target interval; means for generating the plurality of high frequency subband signals from the plurality of low frequency subband signals and from a plurality of spectral gain coefficients associated with the plurality of low frequency subband signals, respectively; and means for adjusting the energy of the plurality of high frequency subband signals using the set of target energies.

170. Strain capacitor energy storage devices and assemblies

Date: 2019-05-07 | ID: 10283282

Abstract: Energy storage devices are disclosed that store both electrical and mechanical energies, making the total energy stored larger than either an electrical or mechanical means alone. The energy storage device is charged by the application of a voltage, which charges a capacitor to store electrical energy while simultaneously exerting a force on the mechanical system that deforms the mechanical system, resulting in mechanical energy storage. When the charged device is discharged, both the electrical and mechanical energy are extracted in electrical form. Its unique features include, but are not limited to, the potential for long lifetime, improved safety, better portability, a wide operating temperature range, and environment friendliness. Arrays of energy storage devices can be assembled in various configurations to build high capacity energy storage units.

171. Base station and method for operating the base station

Date: 2019-05-07 | ID: 10284255

Abstract: Present disclosure relates to a base station and a method for operating the same. The base station includes a communicating unit and a processing unit. The communicating unit is wirelessly connected to user equipments in the internet of things. The communicating unit is configured to receive a frequency hopping preamble sequence from a user equipment. The processing unit, electrically coupled to the communicating unit, is configured to obtain frequency hopping energies corresponding to a plurality of symbol groups from the frequency hopping preamble sequence. The processing unit is configured to accumulate the frequency hopping energies and calculate an average energy corresponding to one symbol group according to the accumulated frequency hopping energies. The processing unit is configured to calculate a threshold based on the average energy and a false alarm rate, wherein the threshold is applied to determine whether signals sending from the user equipment are noises.

172. Apodization of spurs in radar receivers using multi-channel processing

Date: 2019-05-14 | ID: 10288729

Abstract: The various technologies presented herein relate to identification and mitigation of spurious

energies or signals (aka spurs) in radar imaging. Spurious energy in received radar data can be a consequence of non-ideal component and circuit behavior. Such behavior can result from I/Q imbalance, nonlinear component behavior, additive interference (e.g. cross-talk, etc.), etc. The manifestation of the spurious energy in a radar image (e.g., a range-Doppler map) can be influenced by appropriate pulse-to-pulse phase modulation. Comparing multiple images which have been processed using the same data but of different signal paths and modulations enables identification of undesired spurs, with subsequent cropping or apodization of the undesired spurs from a radar image. Spurs can be identified by comparison with a threshold energy. Removal of an undesired spur enables enhanced identification of true targets in a radar image.

173. Communications interface facilitating operations of a persistent spatially-optimized computer-based simulation

Date: 2019-05-14 | ID: 10289767

Abstract: Methods, systems, computer-readable media, and apparatuses for performing, providing, managing, executing, and/or running a spatially-optimized simulation are presented. In one or more embodiments, the spatially-optimized simulation may comprise a plurality of worker modules performing the simulation, a plurality of entities being simulated among the plurality of worker modules, a plurality of bridge modules facilitating communication between workers and an administrative layer including a plurality of chunk modules, at least one receptionist module, and at least one oracle module. The spatially-optimized simulation may be configured to provide a distributed, persistent, fault-tolerant and spatially-optimized simulation environment. In some embodiments, load balancing and fault tolerance may be performed using transfer scores and/or tensile energies determined among the candidates for transferring simulation entities among workers. In some embodiments, the plurality of bridge modules may expose an application programming interface (API) for communicating with the plurality of worker modules.

174. Charged particle beam device and pattern measurement device

Date: 2019-05-14 | ID: 10290464

Abstract: The present invention provides a charged particle beam device capable of predicting the three-dimensional structure of a sample, without affecting the charge of the sample. The present invention provides a charged particle beam device characterized in that a first distance between the peak and the bottom of a first signal waveform obtained on the basis of irradiation with a charged particle beam having a first landing energy, and a second distance between the peak and the bottom of a second signal waveform obtained on the basis of irradiation with a charged particle beam having a second landing energy different

from the first landing energy are obtained, and the distance between the peak and the bottom at a landing energy (zero, for instance) different from the first and second landing energies is obtained on the basis of the extrapolation of the first distance and the second distance.

175. Traffic lights control for fuel efficiency

Date: 2019-05-21 | ID: 10297151

Abstract: Data is received from each of a plurality of vehicles proximate to an intersection indicating a kinetic energy and a time to the intersection. An optimized timing of a traffic light is determined based on an aggregation of the kinetic energies and times to intersection. A timing of the traffic is modified according to the optimized timing.

176. X-ray illumination system with multiple target microstructures

Date: 2019-05-21 | ID: 10297359

Abstract: An x-ray illumination beam system includes an electron emitter and a target having one or more target microstructures. The one or more microstructures may be the same or different material, and may be embedded or placed atop a substrate formed of a heat-conducting material. The x-ray source may emit x-rays towards an optic system, which can include one or more optics that are matched to one or more target microstructures. The matching can be achieved by selecting optics with the geometric shape, size, and surface coating that collects as many x-rays as possible from the source and at an angle that satisfies the critical reflection angle of the x-ray energies of interest from the target. The x-ray illumination beam system allows for an x-ray source that generates x-rays having different spectra and can be used in a variety of applications.

177. Load balancing systems and methods for spatially-optimized simulations

Date: 2019-05-28 | ID: 10303821

Abstract: Methods, systems, computer-readable media, and apparatuses for performing, providing, managing, executing, and/or running a spatially-optimized simulation are presented. In one or more embodiments, the spatially-optimized simulation may comprise a plurality of worker modules performing the simulation, a plurality of entities being simulated among the plurality of worker modules, a plurality of bridge modules facilitating communication between workers and an administrative layer including a plurality of chunk modules, at least one receptionist module, and at least one oracle module. The spatially-optimized simulation may be configured to provide a distributed, persistent, fault-tolerant and spatially-optimized simulation environment. In some embodiments, load balancing and fault tolerance may be performed using transfer scores and/or tensile energies determined among the candidates for transferring simulation entities among

workers. In some embodiments, the plurality of bridge modules may expose an application programming interface (API) for communicating with the plurality of worker modules.

178. Photovoltaic device with transparent glass substrate and dye-sensitized solar cell

Date: 2019-05-28 | ID: 10304636

Abstract: An oxadiazole dye for use as an organic photosensitizer. The oxadiazole dye comprising donor--spacer-acceptor type portions in which at least one of an oxadiazole isomer acts as a -conjugated bridge (spacer), a biphenyl unit acts as an electron-donating unit, a carboxyl group act as an electron acceptor group, and a cyano group acts as an anchor group. An optional thiophene group acts as part of the -conjugated bridge (spacer). The dye for use as organic photosensitizers in a dye-sensitized solar cell and in photodynamic therapies. Computational DFT and time dependent DFT (TD-DFT) modeling techniques showing Light Harvesting Efficiency (LHE), Free Energy for Electron Injection (Ginject), Excitation Energies, and Frontier Molecular Orbitals (FMOs) indicate that the series of dye comprise a more negative Ginject and a higher LHE value; resulting in a higher incident photon to current efficiency (IPCE).

179. Radiation therapy systems and methods

Date: 2019-06-04 | ID: 10307618

Abstract: A radiation therapy system includes an accelerator and beam transport system that generates a beam of particles. The accelerator and beam transport system guides the beam on a path and into a nozzle that is operable for aiming the beam toward an object. The nozzle includes a scanning magnet operable for steering the beam toward different locations within the object, and also includes a beam energy adjuster configured to adjust the beam by, for example, placing different thicknesses of material in the path of the beam to affect the energies of the particles in the beam.

180. Controlling waveforms to reduce cross-talk between inkjet nozzles

Date: 2019-06-04 | ID: 10308013

Abstract: An inkjet printhead includes two groups of interleaved nozzles. First and second sets of drop-formation waveforms are associated with the groups of nozzles to selectively cause portions of a liquid jet to break off into drops. A timing delay device time-shifts the second-group waveforms relative to those associated with the first-group waveforms. A charging-electrode waveform having portions with first and second potentials is provided to a charging electrode. The waveform energies of the second-group waveforms is larger than the waveform energies of the corresponding first-group waveforms so that printing drops break off from the liquid jets while the charging-electrode is at the first potential, and non-printing drops break off from the liquid jets while the charging-electrode is at the second potential.

181. Voice quality conversion device, voice quality conversion method and program

Date: 2019-06-04 | ID: 10311888

Abstract: A voice conversion device includes: a parameter learning unit in which a probabilistic model that uses speech information, speaker information, and phonological information as variables to thereby express relationships among binding energies between any two of the speech information, the speaker information and the phonological information by parameters is prepared, wherein the speech information is obtained based on a speech, the speaker information corresponds to the speech information, and the phonological information expresses the phoneme of the speech, and in which the parameters are determined by performing learning by sequentially inputting the speech information and the speaker information into the probabilistic model; and a voice conversion processing unit that performs voice conversion processing of the speech information obtained on the basis of the speech of an input speaker, based both on the parameters determined by the parameter learning unit and on the speaker information of a target speaker.

182. Coherent combining pulse bursts in time domain

Date: 2019-06-04 | ID: 10312657

Abstract: A beam combining and pulse stacking technique is provided that enhances laser pulse energy by coherent stacking pulse bursts (i.e. non-periodic pulsed signals) in time domain. This energy enhancement is achieved by using various configurations of Fabry-Perot, Gires-Tournois and other types of resonant cavities, so that a multiple-pulse burst incident at either a single input or multiple inputs of the system produces an output with a solitary pulse, which contains the summed energy of the incident multiple pulses from all beams. This disclosure provides a substantial improvement over conventional coherent-combining methods in that it achieves very high pulse energies using a relatively small number of combined laser systems, thus providing with orders of magnitude reduction in system size, complexity, and cost compared to current combining approaches.

183. Target expansion rate control in an extreme ultraviolet light source

Date: 2019-06-04 | ID: 10314153

Abstract: A method includes providing a target material that comprises a component that emits extreme ultraviolet (EUV) light when converted to plasma; directing a first beam of radiation toward the target material to deliver energy to the target material to modify a geometric distribution of the target material to form a modified target; directing a second beam of radiation toward the modified target, the second beam of radiation converting at least part of the modified target to plasma that emits EUV light; measuring one or more characteristics associated with one or more of the target material and the modified target relative to the

first beam of radiation; and controlling an amount of radiant exposure delivered to the target material from the first beam of radiation based on the one or more measured characteristics to within a predetermined range of energies.

184. Laser eye surgery system calibration

Date: 2019-06-11 | ID: 10314746

Abstract: The amount of energy to provide optical breakdown can be determined based on mapped optical breakdown thresholds of the treatment volume, and the laser energy can be adjusted in response to the mapped breakdown thresholds. The mapping of threshold energies can be combined with depth and lateral calibration in order to determine the location of optical breakdown along the laser beam path for an amount of energy determined based on the mapping. The mapping can be used with look up tables to determine mapped locations from one reference system to another reference system.

185. Ultra-responsive phase shifters for depletion mode silicon modulators

Date: 2019-06-11 | ID: 10317710

Abstract: A novel phase shifter design for carrier depletion based silicon modulators, based on an experimentally validated model, is described. It is believed that the heretofore neglected effect of incomplete ionization will have a significant impact on ultra-responsive phase shifters. A low VL product of 0.3 V·cm associated with a low propagation loss of 20 dB/cm is expected to be observed. The phase shifter is based on overlapping implantation steps, where the doses and energies are carefully chosen to utilize counter-doping to produce an S-shaped junction. This junction has a particularly attractive VL figure of merit, while simultaneously achieving attractively low capacitance and optical loss. This improvement will enable significantly smaller Mach-Zehnder modulators to be constructed that nonetheless would have low drive voltages, with substantial decreases in insertion loss. The described fabrication process is of minimal complexity; in particular, no high-resolution lithographic step is required.

186. Ultra broad band continuously tunable electron beam pulser

Date: 2019-06-11 | ID: 10319556

Abstract: An ElectroMagnetic-Mechanical Pulser (EMMP) generates electron pulses at a continuously tunable rate between 100 MHz and 20-50 GHz, with energies up to 0.5 MeV, duty cycles up to 20%, and pulse widths between 100 fs and 10 ps. A dielectric-filled Traveling Wave Transmission Stripline (TWTS) that is terminated by an impedance-matching load such as a 50 ohm load imposes a transverse modulation on a continuous electron beam. The dielectric is configured such that the phase velocity of RF propagated through the TWTS matches a desired electron energy, which can be between 100 and 500 keV, thereby transferring

electromagnetic energy to the electrons. The beam is then chopped into pulses by an adjustable aperture. Pulse dispersion arising from the modulation is minimized by a suppressing section that includes a mirror demodulating TWTS, so that the spatial and temporal coherence of the pulses is substantially identical to the input beam.

187. Method of determining crystallographic properties of a sample and electron beam microscope for performing the method

Date: 2019-06-11 | ID: 10319560

Abstract: A method of determining crystallographic properties of a sample includes: generating first and second electron beams of electrons having first and second mean kinetic energies, respectively; detecting, for each of first locations of a region of the sample, a two-dimensional spatial distribution of electrons incident onto a detection area while directing the first electron beam onto the first locations; generating, for each of the first locations, first data representing the two-dimensional spatial distribution; detecting, for each of second locations of the region of the sample, a two-dimensional spatial distribution of electrons incident onto the detection area while directing the second electron beam onto the second locations; generating, for each of the second locations, second data representing the two-dimensional spatial distribution; and determining the crystallographic properties for target locations of the region based on the first data of the first locations and the second data of the second locations.

188. Space ion analyzer with mass spectrometer on a chip (MSOC) using floating MSOC voltages

Date: 2019-06-11 | ID: 10319572

Abstract: A space ion analyzer in a spacecraft includes an axis and an aperture to receive an ion stream. An ion focuser to focus the ion stream along the axis responsive to a focus voltage, and an ion deflector deflects ions from the axis based on energies of the ions and a deflector voltage difference applied across plates of the ion deflector. A mass spectrometer on a chip (MSOC) directs ions from the ion deflector to an ion detector array responsive to an MSOC voltage difference applied to the MSOC. A focus voltage generator generates the focus voltage as a variable voltage referenced to a spacecraft ground. A deflector voltage generator generates the deflector voltage difference with a controllable magnitude and referenced to the spacecraft ground. An MSOC voltage generator generates the MSOC voltage difference with a controllable magnitude and referenced to a breaking potential controllable relative to the spacecraft ground.

189. Low energy laser spectroscopy LELS

Date: 2019-06-18 | ID: 10324037

Abstract: An extremely sensitive spectroscopy method utilizes a laser modified to an extremely low emission with an integrated control system, interfaced within a typical Raman platform to comprise low energy laser spectroscopy (LELS). LELS acquires and utilizes a quantum entangled state of photons and particles, including omnipresent cosmological dark matter particles (OCDM) and omnipresent cosmological dark energy (OCDE). The OCDM and OCDE matter has an affinity to particles of same OCDM and OCDE matter in target specimens, with same-time data results of high sensitivity. In a semiconductor light emitter, electron flow at a low energy level is provided to a quantum well to produce a quantum tunneling of electrons into an active region of the laser quantum well and creating sublasering. Sublasering allows OCDM and OCDE to become entangled with other particles and energies in the laser's quantum well and create a transmission package comprising quantum entangled fields, waves, wave packages, states and energies. Providing a triggering pulse causes a second tunneling, carrying the transmission package for emission.

190. Organic light emitting device

Date: 2019-06-18 | ID: 10325960

Abstract: An organic light-emitting device and display apparatus, the device including a first electrode; a second electrode facing the first electrode; an emission layer between the first and second electrode; a hole control layer between the first electrode and the emission layer; and an electron control layer between the emission layer and the second electrode, wherein the emission layer includes a plurality of sub-emission layers to emit light having different wavelengths, at least portions of the plurality of sub-emission layers do not overlap one another, the plurality of sub-emission layers include: a first sub-emission layer including a first color light-emitting dopant, and a second sub-emission layer including a second color light-emitting dopant, the first and second sub-emission layers each include a hole-transporting and electron-transporting host which form an exciplex, and a triplet energy of the exciplex is equal to or greater than triplet energies of the first and second color light-emitting dopant.

191. Renal injury inhibiting devices, systems, and methods employing low-frequency ultrasound or other cyclical pressure energies

Date: 2019-06-25 | ID: 10328287

Abstract: Improved devices, systems, and methods treatment of patients can be used to help mitigate injury to the kidneys by applying cyclical mechanical pressure energy at low intensities. The energy often be selectively directed from non-invasive transducers disposed outside the patients. The energy will typically comprise low frequency ultrasound energy, shock wave energy, or the like, and may induce the generation

and/or release of nitric oxide, thereby enhancing perfusion and ameliorating tissue damage. Superimposed micro and macro duty cycles may help avoid thermal and other injury to tissues of the patient during treatment. Bilateral treatments are facilitated by a support structure that orients at least one transducer toward each kidney.

192. Methods and systems for testing luminescent semiconductors

Date: 2019-06-25 | ID: 10330614

Abstract: Methods and systems using low temperature thermo-luminescence to measure donor ionization energies in luminescence semiconductors are described.

193. Apparatus and method for decoding or encoding an audio signal using energy information values for a reconstruction band

Date: 2019-06-25 | ID: 10332531

Abstract: An apparatus for decoding an encoded audio signal having an encoded representation of a first set of first spectral portions and an encoded representation of parametric data indicating spectral energies for a second set of second spectral portions, has: an audio decoder for decoding the encoded representation of the first set of the first spectral portions to obtain a first set of first spectral portions and for decoding the encoded representation of the parametric data to obtain a decoded parametric data for the second set of second spectral portions indicating, for individual reconstruction bands, individual energies; a frequency regenerator for reconstructing spectral values in a reconstruction band having a second spectral portion using a first spectral portion of the first set of the first spectral portions and an individual energy for the reconstruction band, the reconstruction band having a first spectral portion and the second spectral portion.

194. Movable type method applied to protein-ligand binding

Date: 2019-06-25 | ID: 10332616

Abstract: Disclosed herein is a method of estimating the pose of a ligand in a receptor comprising identifying all possible atom pairs of protein-ligand complexes in a given configuration space for a system that comprises proteins; creating a first database and a second database; where the first database comprises associated pairwise distant dependent energies and where the second database comprises all probabilities that include how the atom pairs can combine; combining the first database with the second database via statistical mechanics to accurately estimate binding free energies as well as a pose of a ligand in a receptor; and selecting a protein-ligand complex for further study.

195. 3D physiological detection system and operating method thereof

Date: 2019-07-02 | ID: 10335046

Abstract: A physiological detection system including an image sensor, a converting unit, a retrieving unit and a processing unit is provided. The image sensor includes a plurality of pixels respectively configured to output a PPG signal. The converting unit is configured to convert a plurality of PPG signals of a plurality of pixels regions to a plurality of frequency domain signals. The retrieving unit is configured to respectively retrieve a spectral energy of the frequency domain signals corresponding to each of the pixel regions. The processing unit is configured to construct a 3D energy distribution according to the spectral energies.

196. Cruise control system, vehicle including the same, method of controlling the cruise control system

Date: 2019-07-02 | ID: 10336328

Abstract: A cruise control system, the vehicle including the same, and the method of controlling the cruise control system are provided to improve fuel efficiency by changing control target vehicle speeds by continuously predicting vehicle speeds and variations in required driving forces on roads with various slope variations. Additionally, driving performance is improved by using kinetic energies and preventing unnecessary acceleration and deceleration in comparison with conventional vehicles. Driver convenience and satisfaction is also improved by preventing an unintended operation stop of the cruise control system caused by frequent acceleration and deceleration on roads with substantial slope variations in advance and by preventing unintended acceleration/deceleration on roads with frequent slope variations.

197. Online IGBT junction temperature estimation without the use of a dedicated temperature estimation or measurement device

Date: 2019-07-02 | ID: 10337930

Abstract: A number of variations may include a method which may include determining a temperature rise in an IGBT junction without the use of a temperature estimation or measurement device because determination may be made by first determining the power loss due to the conduction losses of the IGBT and power loss associated with switching the IGBT where these losses may be determined by utilizing the saturation voltage of the IGBT, IGBT PWM duty cycle, IGBT switching frequency, fundamental frequency along with a lookup table for the switching energies and the phase current going through the IGBT. The determined power loss may be multiplied by a measured, sensed or obtained thermal impedance from the IGBT junction. Finally, the determined temperature rise of the IGBT junction may be added to a measured, sensed or obtained temperature of the coolant in order to determine the absolute temperature of the IGBT junction.

198. Alpha/beta radiation shielding materials

Date: 2019-07-02 | ID: 10340049

Abstract: Alpha/beta radiation barrier materials and structures formed to include the barrier materials are described. Barrier materials include a matrix and particulate materials contained in the matrix. The particulates include alpha/beta radiation absorbers. Alpha/beta radiation absorbers of the barrier materials can be molecular, particulates, or defined nanostructures that are capable of absorbing incident alpha/beta particle energies. Matrix materials can include organic or inorganic materials including thermoplastic polymers, thermoset polymers, glasses, ceramics, etc.

199. Quantum cascade laser

Date: 2019-07-02 | ID: 10340662

Abstract: A QCL (10) includes a first electrode (15), a first contact layer (11) that is in contact with the first electrode (15) and is made of a first compound semiconductor, a second electrode (14) having a polarity opposite to that of the first electrode (15), a second contact layer (13) that is in contact with the second electrode (14) and is made of a second compound semiconductor, and an active layer (12) disposed between the first contact layer (11) and the second contact layer (13) and including two or more active layer units. Each of the active layer units includes one or more quantum well layers made of a third compound semiconductor and one or more barrier layers made of a fourth compound semiconductor, and each of the quantum well layers and each of the barrier layers are alternately stacked. The vibrational energies of longitudinal optical phonons of the third compound semiconductor and the fourth compound semiconductor are higher than the vibrational energy of a longitudinal optical phonon of GaAs and lower than or equal to the vibrational energy of a longitudinal optical phonon of AlN.

200. Filter elements, coalescing baffles, filtration vessel and methods

Date: 2019-07-09 | ID: 10343096

Abstract: Improvements to filtration and vessels such as for filtration and coalescing of gas streams are shown. A filter element with a partial treated region and untreated region such as providing different surface energies or other filtration characteristics are provided. Various keying arrangements for compatibility and/or rotational locking are shown between the filtration vessel, a tubular coalescing baffle, and/or filter element. The tubular coalescing baffle also may include non-louvered pore structure, which provides for more even flow in a two stage type filtration vessel to prevent premature exiting and reduction of flow velocities along the second stage, and/or may additionally or alternatively include drainage apertures such as drain slot formed along a gravitational bottom or otherwise to facilitate additional drainage of coalesced liquid as opposed to

letting such liquid be forced through fluid velocity toward the open end of the tubular baffle.