References for AxionLimits webpage

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1 Axion-photon

Haloscopes

- ABRACADABRA [1, 2]
- ADMX [3, 4, 5, 6]
- ADMX-Sidecar [7, 8]
- ADMX-SLIC [9]
- CAPP [10, 11, 12, 13, 14, 15]
- CAST-CAPP [16]
- DANCE [17]
- BASE [18]
- GrAHal [19]
- HAYSTAC [20, 21, 22]
- ORGAN [23, 24]
- QUAX [25, 26, 27]
- RADES [28]
- RBF [29]
- SHAFT [30]
- TASEH [31]
- SuperMAG [32]
- UF [33]
- UPLOAD-DOWNLOAD [34, 35]
- ABRACADABRA (projection) [36]
- ADBC (projection) [37]
- ADMX (projection) [38]
- aLIGO (projection) [39]
- ALPHA (projection) [40, 41]
- BRASS (projection) [42]
- BREAD (projection) [43]
- CADEx (projection) [44]
- DALI (projection) [45]
- DM-Radio (projection) [46, 47]
- DANCE (projection) [48]
- LAMPOST (projection) [49]
- MADMAX (projection) [50]
- FLASH (projection) [51, 52]
- QUAX (projection) [53]
- ORGAN (projection) [23]
- TOORAD (projection) [54]
- Twisted Anyon Cavity (projection) [55]
- WISPLC (projection) [56]
- WISPFI (projection) [57]
- SRF heterodyne cavity (projection) [58]

LSW/Helioscopes

- ALPS [59]
- CAST [60, 61]
- CROWS [62]
- OSQAR [63]
- PVLAS [64]
- SAPPHIRES [65, 66]
- ALPS-II (projection) [67]
- IAXO (projection) [68]
- IAXO (Galactic SN) [69]

Astro

- Axion star explosions [70]
- Betelgeuse [71]
- BICEP/KECK [72]
- Breakthrough Listen (Doppler shifted radio line in MW) [73]
- Bullet Cluster (archival radio data) [74]
- Cosmic IR background (hint) [75]
- Chandra (Hydra) [76]
- Chandra (M87) [77]
- Chandra (NG7 1275) [78]
- Chandra (H1821+643) [79]
- CMB Anisotropies [80, 81]
- COBE/FIRAS+Planck spectral dist. [82]
- Diffuse gamma-rays [83]
- Diffuse SN ALPs [84] (see also [85])
- Distance ladder [86]
- Fermi-LAT (NGC 1275) [87]
- Fermi-LAT (Extragalactic SNe) [88]
- Fermi-LAT (Quasars) [89]
- Gamma-ray attenuation (ALP dark matter) [90]
- Globular clusters (R parameter) [91]
- Globular clusters (R_2 parameter) [92]
- HAWC (TeV Blazars) [93]
- HESS (PKS 2155-304) [94]
- INTEGRAL (ALP decay) [95]
- Leo T gas temperature [96]
- Magnetic white dwarfs (X-rays) [97]
- Magnetic white dwarf (polarization) [98]
- MOJAVE [99]
- Mrk 421 (ARGO-YBJ+Fermi): [100]
- Mrk 421 (ARGO-YBJ+MAGIC): [101]
- Neutron Stars (Foster et al. 2020) [102]
- Neutron Stars (Darling 2020) [103]
- Neutron Stars (Battye et al. 2021) [104]
- Neutron stars (Foster et al. 2022) [105]
- Neutron Stars (Battye et al. 2023) [106]
- NuSTAR (decaying dark matter, recast from Sterile nu) [107, 108, 109]
- Planck cosmic birefringence [110]
- POLARBEAR [111]
- PPTA+QUIJOTE [112]
- Pulsar polarisation arrays (projection) [113]
- Pulsar polar cap [114]
- Red supergiant [115]
- Solar neutrinos [116]
- SN1987A-γ (ALP decay) [117, 118, 119]
- SN1987A-γ (low mass ALP conversion) [120, 118]
- SN1987A-γ,ν (high mass ALPs) [121, 122, 83]
- Low-energy supernovae (ALP decay) [83]
- Solar basin (NuSTAR) [123]
- Solar basin (NuSTAR and SPHINX) [124]
- Star clusters [125]
- SPT [126]
- Telescopes (Haystack) [127]
- Telescopes (MUSE) [128]
- Telescopes (VIMOS) [129]
- Telescopes (HST) [130, 131]
- Fermi galactic SN (projection) [132]
- THESEUS (projection) [133]
- eROSITA (projection) [134]
- White dwarf initial-final mass relation [135]
- XMM-Newton (decaying DM ALPs) [136]

Cosmology

- Ionisation fraction, EBL, X-rays [137]
- BBN+$N_{\rm eff}$ [138]
- Freeze in [139]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [140]
- BaBar [141]
- Beam dump [142, 143, 141, 144, 145]
- Belle II [146]
- BESIII [147]
- CMS (PbPb) [148]
- LEP [149]
- LHC (pp)[150]
- NOMAD [151]
- OPAL [150]
- PrimEx [152, 153]
- CONUS (projection) [154]
- DUNE (projection) [155]
- FASER LLP (projection) [156]

3 Axion-electron

- EDELWEISS [157]
- Magnon non-demolition [158]
- DarkSide-50 [159]
- GERDA [160]
- LUX [161]
- Panda-X [162]
- SuperCDMS [163]
- XENON1T [164, 165]
- XENONnT [166]
- XENON1T (Solar basin) [167]
- Red giants (ωCen) [168]
- NV Centers (projection) [169]
- Solar neutrinos [170]
- Magnons (projection) [171]
- Polaritons (projection) [172]
- DARWIN (projection) [173]
- LZ (projection) [174]
- QUAX [175, 176]
- Semiconductors (projection) [177]
- White dwarf hint [178]
- Freeze-in irreducible axions [139]
- X-rays (1-loop decay) [179]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [180]

- Casimir effect (fifth force) [181]
- CASPEr-ZULF-Comagnetometer [182]
- CASPEr-ZULF-Sidechain [183]
- nEDM (ultracold neutrons and mercury) [184]
- NASDUCK [185, 186]
- PSI HgM (nEDM) [187]
- K-3He comagnetometer (fifth force) [188]
- K-3He comagnetometer (dark matter) [189]
- JEDI [190]
- Old comagnetometers [191]
- Torsion balance [192]
- Neutron star cooling [193] (corrected from [194])
- SN1987A Cooling [195]
- SNO (deuterium dissasociation) [196]
- Proton storage ring (projection) [197]
- Electrostatic storage ring (projection) [198]
- DM comagnetometer (projection) [191]
- CASPEr-gradient (projection) [183]
- Superfluid helium-3 HPD (projection) [199]

5 Axion-EDM

- Axinovae [200]
- Beam EDM [201]
- BBN (dark matter) [202]
- CASPEr-electric [203]
- nEDM [184]
- HfF$^+$ [204]
- JEDI [190]
- Rb/Quartz [205]
- SN1987A [206]
- *Planck*+BAO thermal axion bound [207]
- CASPEr-electric (projection) [208]
- Storage Ring EDM (projection) [208]

6 Axion mass versus f_a

- BBN (dark matter) [202]
- Beam EDM [201]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [209]. I include minor numerical corrections made by [210, 211].
- GW170817 [212]
- HfF$^+$ [204]
- Rb/Quartz [205]
- JEDI [190]
- nEDM [184]
- Piezoaxionic effect (projection) [213]
- *Planck*+BAO thermal axion bound [207]
- SN1987A [206]
- Neutron stars (projection) [209].
- NS-NS and NS-BH Inspirals (projection) [209].
- White dwarfs [214]

6.1 Black hole superradiance

- Baryakhtar et al. [215] (just Stellar mass BHs)
- Mehta et al. [215] (Stellar mass and SMBHs)
- Stott [216]
- Ünal et al. [217] (Quasars)
- Cardoso et al. [218] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [219]
- Buschmann et al. 2020 [220]
- Buschmann et al. 2021 [221]
- Bonati et al. [222]
- Borsanyi et al. [223]
- Berkowitz et al. [224]
- Dine et al. [225]
- Petreczky et al. [226]
- Fleury & Moore [227]
- Klaer & Moore [228]
- Gorghetto et al. [229]
- Saikawa et al. [68]

7.2 Other dark matter predictions

- ALP Cogenesis [230]
- Early matter domination [231]
- Post-inflation ALP misalignment [232, 233]
- Trapped misalignment ($\mathcal{Z}_\mathcal{N}$ axion) [210]

8 CP-violating couplings

Combined constraints [234]

Scalar-nucleon

- Red giants [235]
- MICROSCOPE [236].
- Eot-Wash [237, 238, 239]
- Irvine [240]. Corrected to 2σ limit by [241]
- HUST [242, 243, 244, 245].
- Stanford [246]
- IUPUI [247].
- Wuhan [241]

Pseudoscalar-electron

- Red giants [235]
- Eot-wash [248]
- NIST [249]
- SMILE [250].
- QUAX [251, 252, 253]
- Washington [254, 255].
- XENON1T [256]
- Magnon (projection) [172]
- QUAX (projection) [251].

Pseudoscalar-nucleon

- Neutron star cooling [193]
- Hefei (Earth) [257]
- Hefei (mm) [258]
- Washington [259]. Limit taken from [260].
- SMILE [250].
- Mainz [261]
- Moon/Sun [262]
- ARIADNE (projection) [263]
- CASPEr-wind (projection) [208]
- DM comagnetometer (projection) [191]
- Fifth force Ne-Rb-K comagnetometer (projection) [264]

9 Scalars

Scalar-photon

- Globular clusters [92]
- Eot-Wash (EP) [265]
- Fifth force [266, 267, 268, 269]
- MICROSCOPE [236]
- AURIGA [270]
- BACON [271]
- Cs/Cav [272]
- DAMNED [273]
- Dy/Dy [274]
- Dy/Quartz [205]
- Dynamic Decoupling [275]
- GEO600 [276]
- LIGO O3 [277]
- Holometer [278]
- H/Quartz/Sapphire [279]
- PTB (Yb+, Sr clock) [280]
- I_2 [281]
- Rb/Cs [282]
- Sr/Si [283]
- Yb/Sr [284]
- AEDGE (projection) [285]
- AION (projection) [285]
- DUAL (projection) [286]
- MAGIS (projection) [287]
- Nuclear clock (projection) [288]
- Mechanical Resonators (projection) [289]

Scalar-electron

- Red giants [235]
- White dwarfs [290]
- Eot-Wash (EP) [265]
- Fifth force [266, 267, 268, 269]
- MICROSCOPE [236]
- AURIGA [270]
- Cs/Cav [272]
- DAMNED [273]
- GEO600 [276]
- Holometer [278]
- H/Quartz/Sapphire [279]
- I_2 [281]
- H/Si [283]
- Rb/Quartz [205]
- Yb/Cs [291]
- LIGO O3 [277]
- FOCOS (nuclear clock projection) [292]
- AEDGE (projection) [285]
- AION (projection) [285]
- DUAL (projection) [286]
- Optical microwave clock (projection) [293]
- Optical cavities [294]
- SrOH [295]
- Mechanical Resonators (projection) [289]
- IPTA (mock data) [296]

10 Vectors

B-L coupling

- Casimir [297, 298, 299]
- Eot-Wash (EP) [300]
- Eot-Wash (ISL) [301]
- MICROSCOPE [302]
- DM stability [303]
- Horizontal branch [235]
- Sun [235]
- Eot-Wash (DM) [304]
- LIGO (O1) [305]
- LIGO/VIRGO [305]
- LISA Pathfinder [306]
- PPTA [307]
- Asteroids (projection) [308]
- LISA (projection) [308]
- MAGIS (projection) [287]
- Optomechanical membranes (projection) [309]
- SKA (projection) [310]
- Torsion balance (projection) [310]
- STE-QUEST (projection) [311]

11 Dark photons

Combined constraints [312]

SM photon-DP transitions

- Coulomb [313, 314, 315, 316, 317],
- Plimpton & Lawton's experiment [318, 317]
- Atomic spectroscopy [319]
- Atomic force microscopy (AFM) [317]
- Static magnetic field of the Earth [320, 321, 322]
- Static magnetic field of Jupiter [323, 322].
- ALPs [59]
- ALPS-II (projection) [324]
- SPring-8 [325]
- UWA-LSW [326, 327]
- ADMX-LSW [328]
- CROWS [62].
- DarkSRF [329]
- DarkSRF (projection) [330]
- TEXONO [331]
- Crab nebula [332]
- COBE and FIRAS [333]
- STAX (projection) [334]

Production in stars

- CAST [335]
- SHIPS [336]
- HINODE [337]
- Solar-L, HB and RG stars [338] (see also [339])
- Neutron stars [340]
- Solar neutrinos [341]
- XENON1T [342]

Dark matter cosmology/astro

- Arias et al. [232]
- Witte et al. [343, 344]
- Caputo et al. [345, 333],
- IGM [346],
- Leo T dwarf [347]
- Gas clouds [348]

Dark matter experiments

- Reinterpreted axion limits [312]
- ALPHA [41]
- BREAD (projection) [43]
- DarkSide-50 [159]
- DAMIC [349]
- Dark E-field Radio [350]
- DM Pathfinder [351]
- DOSUE-RR [352]
- FAST Radio antenna [353]
- FUNK [354]
- LAMPOST [355]
- LOFAR (solar corona) [356]
- MuDHI [357]
- ORGAN [358]
- ORPHEUS [359]
- QUALIPHIDE [360]
- Quantum cyclotron [361]
- SENSEI [362]
- SHUKET [363]
- SuperCDMS [364]
- SuperMAG [365, 366]
- SQuAD [367],
- SQMS [368],
- Tokyo dish antennae experiments [369, 370, 371]
- WISPDMX [372]
- XENON(100,1T,nT) [177, 256, 373, 374, 342, 375].

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