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]
- BASE [17]
- GrAHal [18]
- HAYSTAC [19, 20]
- ORGAN [21, 22]
- QUAX [23, 24, 25]
- RADES [26]
- RBF [27]
- SHAFT [28]
- TASEH [29]
- SuperMAG [**?**]
- UF [30]
- UPLOAD-DOWNLOAD [31]
- ABRACADABRA (projection) [32]
- ADBC (projection) [33]
- ADMX (projection) [34]
- aLIGO (projection) [35]
- ALPHA (projection) [36, 37]
- BRASS (projection) [38]
- BREAD (projection) [39]
- CADEx (projection) [40]
- DM-Radio (projection) [41, 42]
- DANCE (projection) [43]
- LAMPOST (projection) [44]
- MADMAX (projection) [45]
- FLASH (projection) [46, 47]
- QUAX (projection) [48]
- ORGAN (projection) [21]
- TOORAD (projection) [49]
- Twisted Anyon Cavity (projection) [50]
- WISPLC (projection) [51]
- SRF heterodyne cavity (projection) [52]

LSW/Helioscopes

- ALPS [53]
- CAST [54, 55]
- CROWS [56]
- OSQAR [57]
- PVLAS [58]
- SAPPHIRES [59, 60]
- ALPS-II (projection) [61]
- IAXO (projection) [62]
- IAXO (Galactic SN) [63]

Astro

- Betelgeuse [64]
- BICEP/KECK [65]
- Breakthrough Listen (Doppler shifted radio line in MW) [66]
- Breakthrough Listen (Neutron stars) [67]
- Bullet Cluster (archival radio data) [68]
- Cosmic IR background (hint) [69]
- Chandra (Hydra) [70]
- Chandra (M87) [71]
- Chandra (NG7 1275) [72]
- Chandra (H1821+643) [73]
- Chandra (Magnetic white dwarfs) [73]
- COBE/FIRAS+Planck spectral dist. [74]
- Diffuse gamma-rays [75]
- Diffuse SN ALPs [76] (see also [77])
- Distance ladder [78]
- Fermi-LAT (NGC 1275) [79]
- Fermi-LAT (Extragalactic SNe) [80]
- Fermi-LAT (Quasars) [81]
- Gamma-ray attenuation (ALP dark matter) [82]
- Globular clusters (R parameter) [83]
- Globular clusters (R_2 parameter) [84]
- HAWC (TeV Blazars) [85]
- HESS (PKS 2155-304) [86]
- INTEGRAL (ALP decay) [87]
- Leo T gas temperature [88]
- Magnetic white dwarf polarization [89]
- MOJAVE [90]
- Mrk 421 (ARGO-YBJ+Fermi): [91]
- Mrk 421 (ARGO-YBJ+MAGIC): [92]
- Neutron Stars (Foster et al.) [93]
- Neutron Stars (Darling) [94]
- Neutron Stars (Battye et al.) [95]
- Planck cosmic birefringence [96]
- PPTA+QUIJOTE [97]
- Pulsar polarisation arrays (projection) [98]
- Pulsar polar cap [99]
- Red supergiant [100]
- Solar neutrinos [101]
- SN1987A-γ (ALP decay) [102, 103]
- SN1987A-γ (low mass ALP conversion) [104, 103]
- SN1987A-γ,ν (high mass ALPs) [105]
- Low-energy supernovae (ALP decay) [75]
- Solar basin (NuSTAR) [106]
- Star clusters [107]
- SPT [108]
- Telescopes (Haystack) [109]
- Telescopes (MUSE) [110]
- Telescopes (VIMOS) [111]
- Telescopes (HST) [112, 113]
- Fermi galactic SN (projection) [114]
- THESEUS (projection) [115]
- eROSITA (projection) [116]
- White dwarf initial-final mass relation [117]
- XMM-Newton (decaying DM ALPs) [118]

Cosmology

- Ionisation fraction, EBL, X-rays [119]
- BBN+$N_{\rm eff}$ [120]
- Freeze in [121]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [122]
- BaBar [123]
- Beam dump [124, 125, 123, 126, 127]
- Belle II [128]
- BESIII [129]
- CMS (PbPb) [130]
- LEP [131]
- LHC (pp)[132]
- NOMAD [133]
- OPAL [132]
- PrimEx [134]
- CONUS (projection) [135]
- DUNE (projection) [136]
- FASER LLP (projection) [137]

3 Axion-electron

- EDELWEISS [138]
- Magnon non-demolition [139]
- GERDA [140]
- LUX [141]
- Panda-X [142]
- SuperCDMS [143]
- XENON1T [144, 145]
- XENONnT [146]
- XENON1T (Solar basin) [147]
- Red giants (ωCen) [148]
- Solar neutrinos [149]
- Magnons (projection) [150]
- Polaritons (projection) [151]
- DARWIN (projection) [152]
- LZ (projection) [153]
- QUAX [154, 155]
- Semiconductors (projection) [156]
- White dwarf hint [157]
- Freeze-in irreducible axions [121]
- X-rays (1-loop decay) [158]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [159]

- CASPEr-ZULF-Comagnetometer [160]
- CASPEr-ZULF-Sidechain [161]
- nEDM (ultracold neutrons and mercury) [162]
- NASDUCK [163, 164]
- PSI HgM [165]
- K-3He comagnetometer (fifth force) [166]
- K-3He comagnetometer (dark matter) [167]
- JEDI [168]
- Old comagnetometers [169]
- Torsion balance [170]
- Neutron star cooling [171] (corrected from [172])
- SN1987A Cooling [173]
- SNO (deuterium dissasociation) [174]
- Proton storage ring (projection) [175]
- DM comagnetometer (projection) [169]
- CASPEr-wind (projection) [161]

5 Axion-EDM

- Beam EDM [176]
- BBN (dark matter) [177]
- CASPEr-electric [178]
- nEDM [162]
- HfF^+ [179]
- JEDI [168]
- Rb/Quartz [180]
- SN1987A [181]
- *Planck*+BAO thermal axion bound [182]
- CASPEr-electric (projection) [183]
- Storage Ring EDM (projection) [183]

6 Axion mass versus f_a

- BBN (dark matter) [177]
- Beam EDM [176]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [184]. I include minor numerical corrections made by [185, 186].
- GW170817 [187]
- HfF^+ [179]
- Rb/Quartz [180]
- JEDI [168]
- nEDM [162]
- Piezoaxionic effect (projection) [188]
- *Planck*+BAO thermal axion bound [182]
- SN1987A [181]
- Neutron stars (projection) [184].
- NS-NS and NS-BH Inspirals (projection) [184].
- White dwarfs [189]

6.1 Black hole superradiance

- Baryakhtar et al. [190] (just Stellar mass BHs)
- Mehta et al. [190] (Stellar mass and SMBHs)
- Stott [191]
- Ünal et al. [192] (Quasars)
- Cardoso et al. [193] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [194]
- Buschmann et al. 2020 [195]
- Buschmann et al. 2021 [196]
- Bonati et al. [197]
- Borsanyi et al. [198]
- Berkowitz et al. [199]
- Dine et al. [200]
- Petreczky et al. [201]
- Fleury & Moore [202]
- Klaer & Moore [203]

7.2 Other dark matter predictions

- ALP Cogenesis [204]
- Early matter domination [205]
- Post-inflation ALP misalignment [206, 207]
- Trapped misalignment ($\mathcal{Z}_N$ axion) [185]

8 CP-violating couplings

Combined constraints [208]

Scalar-nucleon

- Red giants [209]
- MICROSCOPE [210].
- Eot-Wash [211, 212, 213]
- Irvine [214]. Corrected to 2σ limit by [215]
- HUST [216, 217, 218, 219].
- Stanford [220]
- IUPUI [221].
- Wuhan [215]

Pseudoscalar-electron

- Red giants [209]
- Eot-wash [222]
- NIST [223]
- SMILE [224].
- QUAX [225, 226]
- Washington [227, 228].
- XENON1T [229]
- Magnon (projection) [151]
- QUAX (projection) [225].

Pseudoscalar-nucleon

- Neutron star cooling [172]
- Washington [230]. Limit taken from [231].
- SMILE [224].
- Mainz [232]
- ARIADNE (projection) [233]
- CASPEr-wind (projection) [183]
- DM comagnetometer (projection) [169]

9 Scalars

Scalar-photon

- Globular clusters [84]
- Eot-Wash (EP) [234]
- Fifth force [235]
- MICROSCOPE [210]
- AURIGA [236]
- BACON [237]
- Cs/Cav [238]
- DAMNED [239]
- Dy/Dy [240]
- Dy/Quartz [180]
- Dynamic Decoupling [241]
- GEO600 [242]
- Holometer [243]
- H/Quartz/Sapphire [244]
- PTB (Yb+, Sr clock) [245]
- I_2 [246]
- Rb/Cs [247]
- Sr/Si [248]
- AEDGE (projection) [249]
- AION (projection) [249]
- DUAL (projection) [235]
- MAGIS (projection) [250]
- Nuclear clock (projection) [251]
- Mechanical Resonators (projection) [252]

Scalar-electron

- Red giants [209]
- Eot-Wash (EP) [234]
- Fifth force [235]
- MICROSCOPE [210]
- AURIGA [236]
- Cs/Cav [238]
- DAMNED [239]
- GEO600 [242]
- Holometer [243]
- H/Quartz/Sapphire [244]
- I_2 [246]
- H/Si [248]
- Rb/Quartz [180]
- AEDGE (projection) [249]
- AION (projection) [249]
- DUAL (projection) [235]
- Optical microwave clock (projection) [235]
- Optical cavities [253]
- SrOH [254]
- Mechanical Resonators (projection) [252]
- IPTA (mock data) [255]

10 Vectors

B-L coupling

- Casimir [256, 257, 258]
- Eot-Wash (EP) [234]
- Eot-Wash (ISL) [259]
- MICROSCOPE [260]
- DM stability [261]
- Horizontal branch [209]
- Sun [209]
- Eot-Wash (DM) [262]
- LIGO (O1) [263]
- LIGO/VIRGO [263]
- Asteroids (projection) [264]
- LISA (projection) [264]
- MAGIS (projection) [250]
- Optomechanical membranes (projection) [265]
- SKA (projection) [266]
- Torsion balance (projection) [266]

11 Dark photons

Combined constraints [267]

SM photon-DP transitions

- Coulomb [268, 269, 270, 271, 272],
- Plimpton & Lawton's experiment [273, 272]
- Atomic spectroscopy [274]
- Atomic force microscopy (AFM) [272]
- Static magnetic field of the Earth [275, 276, 277]
- Static magnetic field of Jupiter [278, 277].
- ALPs [53]
- SPring-8 [279]
- UWA-LSW [280, 281]
- ADMX-LSW [282]
- CROWS [56].
- TEXONO [283]
- Crab nebula [284]
- COBE and FIRAS [285]

Production in stars

- CAST [286]
- SHIP [287]
- HINODE [288]
- HB and RG stars [289]
- Neutron stars [290]
- Solar neutrinos [291]

Dark matter cosmology/astro

- Arias et al. [206]
- Witte et al. [292, 293]
- Caputo et al. [294, 285],
- IGM [295],
- Leo T dwarf [296]
- Gas clouds [297]

Dark matter experiments

- Reinterpreted axion limits [267]
- BREAD (projection) [39]
- DAMIC [298]
- Dark E-field Radio [299]
- DM Pathfinder [300]
- DOSUE-RR [301]
- FAST Radio antenna [302]
- FUNK [303]
- LAMPOST [304]
- LOFAR (solar corona) [305]
- MuDHI [306]
- ORGAN [307]
- ORPHEUS [308]
- QUALIPHIDE [309]
- Quantum cyclotron [310]
- SENSEI [311]
- SHUKET [312]
- SuperCDMS [313]
- SuperMAG [314, 315]
- SQuAD [316],
- SQMS [317],
- Tokyo dish antennae experiments [318, 319, 320]
- WISPDMX [321]
- XENON(100,1T,nT) [156, 229, 322, 323, 324, 325].

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