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]
- Trapped misalignment ($\mathcal{Z}_N$ axion) [185]

8 CP-violating couplings

Combined constraints [207]

Scalar-nucleon

- Red giants [208]
- MICROSCOPE [209].
- Eot-Wash [210, 211, 212]
- Irvine [213]. Corrected to 2σ limit by [214]
- HUST [215, 216, 217, 218].
- Stanford [219]
- IUPUI [220].
- Wuhan [214]

Pseudoscalar-electron

- Red giants [208]
- Eot-wash [221]
- NIST [222]
- SMILE [223].
- QUAX [224, 225]
- Washington [226, 227].
- XENON1T [228]
- Magnon (projection) [151]
- QUAX (projection) [224].

Pseudoscalar-nucleon

- Neutron star cooling [172]
- Washington [229]. Limit taken from [230].
- SMILE [223].
- Mainz [231]
- ARIADNE (projection) [232]
- CASPEr-wind (projection) [183]
- DM comagnetometer (projection) [169]

9 Scalars

Scalar-photon

- Globular clusters [84]
- Eot-Wash (EP) [233]
- Fifth force [234]
- MICROSCOPE [209]
- AURIGA [235]
- BACON [236]
- Cs/Cav [237]
- DAMNED [238]
- Dy/Dy [239]
- Dy/Quartz [180]
- Dynamic Decoupling [240]
- GEO600 [241]
- Holometer [242]
- H/Quartz/Sapphire [243]
- PTB (Yb+, Sr clock) [244]
- I_2 [245]
- Rb/Cs [246]
- Sr/Si [247]
- AEDGE (projection) [248]
- AION (projection) [248]
- DUAL (projection) [234]
- MAGIS (projection) [249]
- Nuclear clock (projection) [250]
- Mechanical Resonators (projection) [251]

Scalar-electron

- Red giants [208]
- Eot-Wash (EP) [233]
- Fifth force [234]
- MICROSCOPE [209]
- AURIGA [235]
- Cs/Cav [237]
- DAMNED [238]
- GEO600 [241]
- Holometer [242]
- H/Quartz/Sapphire [243]
- I_2 [245]
- H/Si [247]
- Rb/Quartz [180]
- AEDGE (projection) [248]
- AION (projection) [248]
- DUAL (projection) [234]
- Optical microwave clock (projection) [234]
- Optical cavities [252]
- SrOH [253]
- Mechanical Resonators (projection) [251]
- IPTA (mock data) [254]

10 Vectors

B-L coupling

- Casimir [255, 256, 257]
- Eot-Wash (EP) [233]
- Eot-Wash (ISL) [258]
- MICROSCOPE [259]
- DM stability [260]
- Horizontal branch [208]
- Sun [208]
- Eot-Wash (DM) [261]
- LIGO (O1) [262]
- LIGO/VIRGO [262]
- Asteroids (projection) [263]
- LISA (projection) [263]
- MAGIS (projection) [249]
- Optomechanical membranes (projection) [264]
- SKA (projection) [265]
- Torsion balance (projection) [265]

11 Dark photons

Combined constraints [266]

SM photon-DP transitions

- Coulomb [267, 268, 269, 270, 271],
- Plimpton & Lawton's experiment [272, 271]
- Atomic spectroscopy [273]
- Atomic force microscopy (AFM) [271]
- Static magnetic field of the Earth [274, 275, 276]
- Static magnetic field of Jupiter [277, 276].
- ALPs [53]
- SPring-8 [278]
- UWA-LSW [279, 280]
- ADMX-LSW [281]
- CROWS [56].
- TEXONO [282]
- Crab nebula [283]
- COBE and FIRAS [284]

Production in stars

- CAST [285]
- SHIP [286]
- HINODE [287]
- HB and RG stars [288]
- Neutron stars [289]
- Solar neutrinos [290]

Dark matter cosmology/astro

- Arias et al. [206]
- Witte et al. [291, 292]
- Caputo et al. [293, 284],
- IGM [294],
- Leo T dwarf [295]
- Gas clouds [296]

Dark matter experiments

- Reinterpreted axion limits [266]
- BREAD (projection) [39]
- DAMIC [297]
- Dark E-field Radio [298]
- DM Pathfinder [299]
- DOSUE-RR [300]
- FAST Radio antenna [301]
- FUNK [302]
- LAMPOST [303]
- LOFAR (solar corona) [304]
- MuDHI [305]
- ORGAN [306]
- ORPHEUS [307]
- QUALIPHIDE [308]
- Quantum cyclotron [309]
- SENSEI [310]
- SHUKET [311]
- SuperCDMS [312]
- SuperMAG [313, 314]
- SQuAD [315],
- SQMS [316],
- Tokyo dish antennae experiments [317, 318, 319]
- WISPDMX [320]
- XENON(100,1T,nT) [156, 228, 321, 322, 323, 324].

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