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 [30]
- UF [31]
- UPLOAD-DOWNLOAD [32]
- ABRACADABRA (projection) [33]
- ADBC (projection) [34]
- ADMX (projection) [35]
- aLIGO (projection) [36]
- ALPHA (projection) [37, 38]
- BRASS (projection) [39]
- BREAD (projection) [40]
- CADEx (projection) [41]
- DM-Radio (projection) [42, 43]
- DANCE (projection) [44]
- LAMPOST (projection) [45]
- MADMAX (projection) [46]
- FLASH (projection) [47, 48]
- QUAX (projection) [49]
- ORGAN (projection) [21]
- TOORAD (projection) [50]
- Twisted Anyon Cavity (projection) [51]
- WISPLC (projection) [52]
- SRF heterodyne cavity (projection) [53]

LSW/Helioscopes

- ALPS [54]
- CAST [55, 56]
- CROWS [57]
- OSQAR [58]
- PVLAS [59]
- SAPPHIRES [60, 61]
- ALPS-II (projection) [62]
- IAXO (projection) [63]
- IAXO (Galactic SN) [64]

Astro

- Betelgeuse [65]
- BICEP/KECK [66]
- Breakthrough Listen (Doppler shifted radio line in MW) [67]
- Breakthrough Listen (Neutron stars) [68]
- Bullet Cluster (archival radio data) [69]
- Cosmic IR background (hint) [70]
- Chandra (Hydra) [71]
- Chandra (M87) [72]
- Chandra (NG7 1275) [73]
- Chandra (H1821+643) [74]
- Chandra (Magnetic white dwarfs) [74]
- COBE/FIRAS+Planck spectral dist. [75]
- Diffuse gamma-rays [76]
- Diffuse SN ALPs [77] (see also [78])
- Distance ladder [79]
- Fermi-LAT (NGC 1275) [80]
- Fermi-LAT (Extragalactic SNe) [81]
- Fermi-LAT (Quasars) [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) [76]
- Solar basin (NuSTAR) [106]
- Star clusters [107]
- SPT [108]
- Telescopes (Haystack) [109]
- Telescopes (MUSE) [110]
- Telescopes (VIMOS) [111]
- Telescopes (HST) [112]
- Fermi galactic SN (projection) [113]
- THESEUS (projection) [114]
- eROSITA (projection) [115]
- White dwarf initial-final mass relation [116]
- ~~XMM-Newton (decaying DM ALPs) [117]~~

Cosmology

- Ionisation fraction, EBL, X-rays [118]
- BBN+$N_{\rm eff}$ [119]
- Freeze in [120]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [121]
- BaBar [122]
- Beam dump [123, 124, 122, 125, 126]
- Belle II [127]
- BESIII [128]
- CMS (PbPb) [129]
- LEP [130]
- LHC (pp)[131]
- NOMAD [132]
- OPAL [131]
- PrimEx [133]
- CONUS (projection) [134]
- DUNE (projection) [135]
- FASER LLP (projection) [136]

3 Axion-electron

- EDELWEISS [137]
- Magnon non-demolition [138]
- GERDA [139]
- LUX [140]
- Panda-X [141]
- SuperCDMS [142]
- XENON1T [143, 144]
- XENONnT [145]
- XENON1T (Solar basin) [146]
- Red giants (ωCen) [147]
- Solar neutrinos [148]
- Magnons (projection) [149]
- Polaritons (projection) [150]
- DARWIN (projection) [151]
- LZ (projection) [152]
- QUAX [153, 154]
- Semiconductors (projection) [155]
- White dwarf hint [156]
- Freeze-in irreducible axions [120]
- X-rays (1-loop decay) [157]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [158]

- CASPEr-ZULF-Comagnetometer [159]
- CASPEr-ZULF-Sidechain [160]
- nEDM (ultracold neutrons and mercury) [161]
- NASDUCK [162, 163]
- PSI HgM [164]
- K-3He comagnetometer (fifth force) [165]
- K-3He comagnetometer (dark matter) [166]
- JEDI [167]
- Old comagnetometers [168]
- Torsion balance [169]
- Neutron star cooling [170] (corrected from [171])
- SN1987A Cooling [172]
- SNO (deuterium dissasociation) [173]
- Proton storage ring (projection) [174]
- DM comagnetometer (projection) [168]
- CASPEr-wind (projection) [160]

5 Axion-EDM

- Beam EDM [175]
- BBN (dark matter) [176]
- CASPEr-electric [177]
- nEDM [161]
- HfF^+ [178]
- JEDI [167]
- Rb/Quartz [179]
- SN1987A [180]
- *Planck*+BAO thermal axion bound [181]
- CASPEr-electric (projection) [182]
- Storage Ring EDM (projection) [182]

6 Axion mass versus f_a

- BBN (dark matter) [176]
- Beam EDM [175]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [183]. I include minor numerical corrections made by [184, 185].
- GW170817 [186]
- HfF^+ [178]
- Rb/Quartz [179]
- JEDI [167]
- nEDM [161]
- Piezoaxionic effect (projection) [187]
- *Planck*+BAO thermal axion bound [181]
- SN1987A [180]
- Neutron stars (projection) [183].
- NS-NS and NS-BH Inspirals (projection) [183].
- White dwarfs [188]

6.1 Black hole superradiance

- Baryakhtar et al. [189] (just Stellar mass BHs)
- Mehta et al. [189] (Stellar mass and SMBHs)
- Stott [190]
- Ünal et al. [191] (Quasars)
- Cardoso et al. [192] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [193]
- Buschmann et al. 2020 [194]
- Buschmann et al. 2021 [195]
- Bonati et al. [196]
- Borsanyi et al. [197]
- Berkowitz et al. [198]
- Dine et al. [199]
- Petreczky et al. [200]
- Fleury & Moore [201]
- Klaer & Moore [202]

7.2 Other dark matter predictions

- ALP Cogenesis [203]
- Early matter domination [204]
- Post-inflation ALP misalignment [205]
- Trapped misalignment ($\mathcal{Z}_N$ axion) [184]

8 CP-violating couplings

Combined constraints [206]

Scalar-nucleon

- Red giants [207]
- MICROSCOPE [208].
- Eot-Wash [209, 210, 211]
- Irvine [212]. Corrected to 2σ limit by [213]
- HUST [214, 215, 216, 217].
- Stanford [218]
- IUPUI [219].
- Wuhan [213]

Pseudoscalar-electron

- Red giants [207]
- Eot-wash [220]
- NIST [221]
- SMILE [222].
- QUAX [223, 224]
- Washington [225, 226].
- XENON1T [227]
- Magnon (projection) [150]
- QUAX (projection) [223].

Pseudoscalar-nucleon

- Neutron star cooling [171]
- Washington [228]. Limit taken from [229].
- SMILE [222].
- Mainz [230]
- ARIADNE (projection) [231]
- CASPEr-wind (projection) [182]
- DM comagnetometer (projection) [168]

9 Scalars

Scalar-photon

- Globular clusters [84]
- Eot-Wash (EP) [232]
- Fifth force [233]
- MICROSCOPE [208]
- AURIGA [234]
- BACON [235]
- Cs/Cav [236]
- DAMNED [237]
- Dy/Dy [238]
- Dy/Quartz [179]
- Dynamic Decoupling [239]
- GEO600 [240]
- Holometer [241]
- H/Quartz/Sapphire [242]
- PTB (Yb+, Sr clock) [243]
- I_2 [244]
- Rb/Cs [245]
- Sr/Si [246]
- AEDGE (projection) [247]
- AION (projection) [247]
- DUAL (projection) [233]
- MAGIS (projection) [248]
- Nuclear clock (projection) [249]
- Mechanical Resonators (projection) [250]

Scalar-electron

- Red giants [207]
- Eot-Wash (EP) [232]
- Fifth force [233]
- MICROSCOPE [208]
- AURIGA [234]
- Cs/Cav [236]
- DAMNED [237]
- GEO600 [240]
- Holometer [241]
- H/Quartz/Sapphire [242]
- I_2 [244]
- H/Si [246]
- Rb/Quartz [179]
- AEDGE (projection) [247]
- AION (projection) [247]
- DUAL (projection) [233]
- Optical microwave clock (projection) [233]
- Optical cavities [251]
- SrOH [252]
- Mechanical Resonators (projection) [250]
- IPTA (mock data) [253]

10 Vectors

B-L coupling

- Casimir [254, 255, 256]
- Eot-Wash (EP) [232]
- Eot-Wash (ISL) [257]
- MICROSCOPE [258]
- DM stability [259]
- Horizontal branch [207]
- Sun [207]
- Eot-Wash (DM) [260]
- LIGO (O1) [261]
- LIGO/VIRGO [261]
- Asteroids (projection) [262]
- LISA (projection) [262]
- MAGIS (projection) [248]
- Optomechanical membranes (projection) [263]
- SKA (projection) [264]
- Torsion balance (projection) [264]

11 Dark photons

Combined constraints [265]

SM photon-DP transitions

- Coulomb [266, 267, 268, 269, 270],
- Plimpton & Lawton's experiment [271, 270]
- Atomic spectroscopy [272]
- Atomic force microscopy (AFM) [270]
- Static magnetic field of the Earth [273, 274, 275]
- Static magnetic field of Jupiter [276, 275].
- ALPs [54]
- SPring-8 [277]
- UWA-LSW [278, 279]
- ADMX-LSW [280]
- CROWS [57].
- TEXONO [281]
- Crab nebula [282]
- COBE and FIRAS [283]

Production in stars

- CAST [284]
- SHIP [285]
- HINODE [286]
- HB and RG stars [287]
- Neutron stars [288]
- Solar neutrinos [289]

Dark matter cosmology/astro

- Arias et al. [205]
- Witte et al. [290, 291]
- Caputo et al. [292, 283],
- IGM [293],
- Leo T dwarf [294]
- Gas clouds [295]

Dark matter experiments

- Reinterpreted axion limits [265]
- BREAD (projection) [40]
- DAMIC [296]
- Dark E-field Radio [297]
- DM Pathfinder [298]
- DOSUE-RR [299]
- FAST Radio antenna [300]
- FUNK [301]
- LAMPOST [302]
- LOFAR (solar corona) [303]
- MuDHI [304]
- ORGAN [305]
- ORPHEUS [306]
- QUALIPHIDE [307]
- Quantum cyclotron [308]
- SENSEI [309]
- SHUKET [310]
- SuperCDMS [311]
- SuperMAG [312, 313]
- SQuAD [314],
- SQMS [315],
- Tokyo dish antennae experiments [316, 317, 318]
- WISPDMX [319]
- XENON(100,1T,nT) [155, 227, 320, 321, 322, 323].

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