

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]
- Gamma-ray attenuation (ALP dark matter) [83]
- Globular clusters (R parameter) [84]
- Globular clusters (R_2 parameter) [85]
- HAWC (TeV Blazars) [86]
- HESS (PKS 2155-304) [87]
- INTEGRAL (ALP decay) [88]
- Leo T gas temperature [89]
- Magnetic white dwarf polarization [90]
- MOJAVE [91]
- Mrk 421 (ARGO-YBJ+Fermi): [92]
- Mrk 421 (ARGO-YBJ+MAGIC): [93]
- Neutron Stars (Foster et al.) [94]
- Neutron Stars (Darling) [95]
- Neutron Stars (Battye et al.) [96]
- Planck cosmic birefringence [97]
- PPTA+QUIJOTE [98]
- Pulsar polarisation arrays (projection) [99]
- Pulsar polar cap [100]
- Red supergiant [101]
- Solar neutrinos [102]
- SN1987A- γ (ALP decay) [103, 104]
- SN1987A- γ (low mass ALP conversion) [105, 104]
- SN1987A- γ, ν (high mass ALPs) [106]
- Low-energy supernovae (ALP decay) [76]
- Solar basin (NuSTAR) [107]
- Star clusters [108]
- SPT [109]
- Telescopes (Haystack) [110]
- Telescopes (MUSE) [111]
- Telescopes (VIMOS) [112]
- Telescopes (HST) [113, 114]
- Fermi galactic SN (projection) [115]
- THESEUS (projection) [116]
- eROSITA (projection) [117]
- White dwarf initial-final mass relation [118]
- XMM-Newton (decaying DM ALPs) [119]

Cosmology

- Ionisation fraction, EBL, X-rays [120]
- BBN+ N_{eff} [121]
- Freeze in [122]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [123]
- BaBar [124]
- Beam dump [125, 126, 124, 127, 128]
- Belle II [129]
- BESIII [130]
- CMS (PbPb) [131]
- LEP [132]
- LHC (pp)[133]
- NOMAD [134]
- OPAL [133]
- PrimEx [135]
- CONUS (projection) [136]
- DUNE (projection) [137]
- FASER LLP (projection) [138]

3 Axion-electron

- EDELWEISS [139]
- Magnon non-demolition [140]
- GERDA [141]
- LUX [142]
- Panda-X [143]
- SuperCDMS [144]
- XENON1T [145, 146]
- XENONnT [147]
- XENON1T (Solar basin) [148]
- Red giants (ω Cen) [149]
- Solar neutrinos [150]
- Magnons (projection) [151]
- Polaritons (projection) [152]
- DARWIN (projection) [153]
- LZ (projection) [154]
- QUAX [155, 156]
- Semiconductors (projection) [157]
- White dwarf hint [158]
- Freeze-in irreducible axions [122]
- X-rays (1-loop decay) [159]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [160]

- CASPEr-ZULF-Comagnetometer [161]
- CASPEr-ZULF-Sidechain [162]
- nEDM (ultracold neutrons and mercury) [163]
- NASDUCK [164, 165]
- PSI HgM [166]
- K-3He comagnetometer (fifth force) [167]
- K-3He comagnetometer (dark matter) [168]
- JEDI [169]
- Old comagnetometers [170]
- Torsion balance [171]
- Neutron star cooling [172] (corrected from [173])
- SN1987A Cooling [174]
- SNO (deuterium dissasociation) [175]
- Proton storage ring (projection) [176]
- DM comagnetometer (projection) [170]
- CASPEr-wind (projection) [162]

5 Axion-EDM

- Beam EDM [177]
- BBN (dark matter) [178]
- CASPER-electric [179]
- nEDM [163]
- HfF^+ [180]
- JEDI [169]
- Rb/Quartz [181]
- SN1987A [182]
- *Planck*+BAO thermal axion bound [183]
- CASPER-electric (projection) [184]
- Storage Ring EDM (projection) [184]

6 Axion mass versus f_a

- BBN (dark matter) [178]
- Beam EDM [177]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [185]. I include minor numerical corrections made by [186, 187].
- GW170817 [188]
- HfF^+ [180]
- Rb/Quartz [181]
- JEDI [169]
- nEDM [163]
- Piezoaxionic effect (projection) [189]
- *Planck*+BAO thermal axion bound [183]
- SN1987A [182]
- Neutron stars (projection) [185].
- NS-NS and NS-BH Inspirals (projection) [185].
- White dwarfs [190]

6.1 Black hole superradiance

- Baryakhtar et al. [191] (just Stellar mass BHs)
- Mehta et al. [191] (Stellar mass and SMBHs)
- Stott [192]
- Ünal et al. [193] (Quasars)
- Cardoso et al. [194] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [195]
- Buschmann et al. 2020 [196]
- Buschmann et al. 2021 [197]
- Bonati et al. [198]
- Borsanyi et al. [199]
- Berkowitz et al. [200]
- Dine et al. [201]
- Petreczky et al. [202]
- Fleury & Moore [203]
- Klaer & Moore [204]

7.2 Other dark matter predictions

- ALP Cogenesis [205]
- Early matter domination [206]
- Post-inflation ALP misalignment [207]
- Trapped misalignment ($\mathcal{Z}_{\mathcal{N}}$ axion) [186]

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) [152]
- QUAX (projection) [225].

Pseudoscalar-nucleon

- Neutron star cooling [173]
- Washington [230]. Limit taken from [231].
- SMILE [224].
- Mainz [232]
- ARIADNE (projection) [233]
- CASPER-wind (projection) [184]
- DM comagnetometer (projection) [170]

9 Scalars

Scalar-photon

- Globular clusters [85]
- Eot-Wash (EP) [234]
- Fifth force [235]
- MICROSCOPE [210]
- AURIGA [236]
- BACON [237]
- Cs/Cav [238]
- DAMNED [239]
- Dy/Dy [240]
- Dy/Quartz [181]
- Dynamic Decoupling [241]
- GEO600 [242]
- Holometer [243]
- H/Quartz/Sapphire [244]
- PTB (Yb+, Sr clock) [245]
- I₂ [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]
- I₂ [246]
- H/Si [248]
- Rb/Quartz [181]
- 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 [54]
- SPring-8 [279]
- UWA-LSW [280, 281]
- ADMX-LSW [282]
- CROWS [57].
- 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. [207]
- 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) [40]
- 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]
- WISPDMS [321]
- XENON(100,1T,nT) [157, 229, 322, 323, 324, 325].

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