

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]
- Solar neutrinos [100]
- SN1987A- γ [101]
- SN1987A- γ (low mass ALPs) [102]
- SN1987A- γ, ν (high mass ALPs) [103]
- Low-energy supernovae (ALP decay) [76]
- Solar basin (NuSTAR) [104]
- Star clusters [105]
- SPT [106]
- Telescopes (Haystack) [107]
- Telescopes (MUSE) [108]
- Telescopes (VIMOS) [109]
- Telescopes (HST) [110]
- Fermi galactic SN (projection) [111]
- THESEUS (projection) [112]
- eROSITA (projection) [113]
- White dwarf initial-final mass relation [114]
- XMM-Newton (decaying DM ALPs) [115]

Cosmology

- Ionisation fraction, EBL, X-rays [116]
- BBN+ N_{eff} [117]
- Freeze in [118]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [119]
- BaBar [120]
- Beam dump [121, 122, 120, 123, 124]
- Belle II [125]
- BESIII [126]
- CMS (PbPb) [127]
- LEP [128]
- LHC (pp)[129]
- NOMAD [130]
- OPAL [129]
- PrimEx [131]
- CONUS (projection) [132]
- DUNE (projection) [133]
- FASER LLP (projection) [134]

3 Axion-electron

- EDELWEISS [135]
- Magnon non-demolition [136]
- GERDA [137]
- LUX [138]
- Panda-X [139]
- SuperCDMS [140]
- XENON1T [141, 142]
- XENONnT [in prep.]
- XENON1T (Solar basin) [143]
- Red giants (ω Cen) [144]
- Solar neutrinos [145]
- Magnons (projection) [146]
- Polaritons (projection) [147]
- DARWIN (projection) [148]
- LZ (projection) [149]
- QUAX [150, 151]
- Semiconductors (projection) [152]
- White dwarf hint [153]
- Freeze-in irreducible axions [118]
- X-rays (1-loop decay) [154]

4 Axion-nucleon

Note: CASPER and nEDM limits account for stochastic correction reported in [155]

- CASPER-ZULF-Comagnetometer [156]
- CASPER-ZULF-Sidechain [157]
- nEDM (ultracold neutrons and mercury) [158]
- NASDUCK [159, 160]
- PSI HgM [161]
- K-3He comagnetometer (fifth force) [162]
- K-3He comagnetometer (dark matter) [163]
- JEDI [164]
- Old comagnetometers [165]
- Torsion balance [166]
- Neutron star cooling [167] (corrected from [168])
- SN1987A Cooling [169]
- SNO (deuterium dissasociation) [170]
- Proton storage ring (projection) [171]
- DM comagnetometer (projection) [165]
- CASPER-wind (projection) [157]

5 Axion-EDM

- Beam EDM [172]
- CASPER-electric [173]
- nEDM [158]
- HfF⁺ [174]
- JEDI [164]
- SN1987A [175]
- Planck+BAO thermal axion bound [176]
- CASPER-electric (projection) [177]
- Storage Ring EDM (projection) [177]

6 Axion mass versus f_a

- BBN [178]
- Beam EDM [172]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [179]. I include minor numerical corrections made by [180, 181].
- GW170817 [182]
- HfF⁺ [174]
- JEDI [164]
- nEDM [158]
- Piezoaxionic effect (projection) [183]
- SN1987A [175]
- Neutron stars (projection) [179].
- NS-NS and NS-BH Inspirals (projection) [179].
- White dwarfs [184]

6.1 Black hole superradiance

- Baryakhtar et al. [185] (just Stellar mass BHs)
- Mehta et al. [185] (Stellar mass and SMBHs)
- Stott [186]
- Ünal et al. [187] (Quasars)
- Cardoso et al. [188] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [189]
- Buschmann et al. 2020 [190]
- Buschmann et al. 2021 [191]
- Bonati et al. [192]
- Borsanyi et al. [193]
- Berkowitz et al. [194]
- Dine et al. [195]
- Petreczky et al. [196]
- Fleury & Moore [197]
- Klaer & Moore [198]

7.2 Other dark matter predictions

- ALP Cogenesis [199]
- Early matter domination [200]
- Post-inflation ALP misalignment [201]
- Trapped misalignment ($\mathcal{Z}_{\mathcal{N}}$ axion) [180]

8 CP-violating couplings

Combined constraints [202]

Scalar-nucleon

- Red giants [203]
- MICROSCOPE [204].
- Eot-Wash [205, 206, 207]
- Irvine [208]. Corrected to 2σ limit by [209]
- HUST [210, 211, 212, 213].
- Stanford [214]
- IUPUI [215].
- Wuhan [209]

Pseudoscalar-electron

- Red giants [203]
- Eot-wash [216]
- NIST [217]
- SMILE [218].
- QUAX [219, 220]
- Washington [221, 222].
- XENON1T [223]
- Magnon (projection) [147]
- QUAX (projection) [219].

Pseudoscalar-nucleon

- Neutron star cooling [168]
- Washington [224]. Limit taken from [225].
- SMILE [218].
- Mainz [226]
- ARIADNE (projection) [227]
- CASPER-wind (projection) [177]
- DM comagnetometer (projection) [165]

9 Scalars

Scalar-photon

- Globular clusters [84]

Scalar-electron

- Red giants [203]

10 Vectors

B-L coupling

- Globular clusters [84]

11 Dark photons

Combined constraints [228]

SM photon-DP transitions

- Coulomb [229, 230, 231, 232, 233],
- Plimpton & Lawton's experiment [234, 233]
- Atomic spectroscopy [235]
- Atomic force microscopy (AFM) [233]
- Static magnetic field of the Earth [236, 237, 238]
- Static magnetic field of Jupiter [239, 238].
- ALPs [54]
- SPring-8 [240]
- UWA-LSW [241, 242]
- ADMX-LSW [243]
- CROWS [57].
- TEXONO [244]
- Crab nebula [245]
- COBE and FIRAS [246]

Production in stars

- CAST [247]
- SHIP [248]
- HINODE [249]
- HB and RG stars [250]
- Neutron stars [251]
- Solar neutrinos [252]

Dark matter cosmology/astro

- Arias et al. [201]
- Witte et al. [253, 254]
- Caputo et al. [255, 246],
- IGM [256],
- Leo T dwarf [257]
- Gas clouds [258]

Dark matter experiments

- Reinterpreted axion limits [228]
- BREAD (projection) [40]
- DAMIC [259]
- Dark E-field Radio [260]
- DM Pathfinder [261]
- DOSUE-RR [262]
- FAST Radio antenna [263]
- FUNK [264]
- LAMPOST [265]
- MuDHI [266]
- ORGAN [267]
- ORPHEUS [268]
- QUALIPHIDE [269]
- Quantum cyclotron [270]
- SENSEI [271]
- SHUKET [272]
- SuperCDMS [273]
- SuperMAG [274, 275]
- SQuAD [276],
- SQMS [277],
- Tokyo dish antennae experiments [278, 279, 280]
- WISPDMS [281]
- XENON(100,1T,nT) [152, 223, 282, 283, 284, 285].

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