

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, 21]
- ORGAN [22, 23]
- QUAX [24, 25, 26]
- RADES [27]
- RBF [28]
- SHAFT [29]
- TASEH [30]
- SuperMAG [?]
- 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) [22]
- 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]
- 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 dwarfs (X-rays) [90]
- Magnetic white dwarf (polarization) [91]
- MOJAVE [92]
- Mrk 421 (ARGO-YBJ+Fermi): [93]
- Mrk 421 (ARGO-YBJ+MAGIC): [94]
- Neutron Stars (Foster et al.) [95]
- Neutron Stars (Darling) [96]
- Neutron Stars (Battye et al.) [97]
- Planck cosmic birefringence [98]
- PPTA+QUIJOTE [99]
- Pulsar polarisation arrays (projection) [100]
- Pulsar polar cap [101]
- Red supergiant [102]
- Solar neutrinos [103]
- SN1987A- γ (ALP decay) [104, 105]
- SN1987A- γ (low mass ALP conversion) [106, 105]
- SN1987A- γ, ν (high mass ALPs) [107]
- Low-energy supernovae (ALP decay) [76]
- Solar basin (NuSTAR) [108]
- Star clusters [109]
- SPT [110]
- Telescopes (Haystack) [111]
- Telescopes (MUSE) [112]
- Telescopes (VIMOS) [113]
- Telescopes (HST) [114, 115]
- Fermi galactic SN (projection) [116]
- THESEUS (projection) [117]
- eROSITA (projection) [118]
- White dwarf initial-final mass relation [119]
- XMM-Newton (decaying DM ALPs) [120]

Cosmology

- Ionisation fraction, EBL, X-rays [121]
- BBN+ N_{eff} [122]
- Freeze in [123]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [124]
- BaBar [125]
- Beam dump [126, 127, 125, 128, 129]
- Belle II [130]
- BESIII [131]
- CMS (PbPb) [132]
- LEP [133]
- LHC (pp)[134]
- NOMAD [135]
- OPAL [134]
- PrimEx [136]
- CONUS (projection) [137]
- DUNE (projection) [138]
- FASER LLP (projection) [139]

3 Axion-electron

- EDELWEISS [140]
- Magnon non-demolition [141]
- GERDA [142]
- LUX [143]
- Panda-X [144]
- SuperCDMS [145]
- XENON1T [146, 147]
- XENONnT [148]
- XENON1T (Solar basin) [149]
- Red giants (ω Cen) [150]
- Solar neutrinos [151]
- Magnons (projection) [152]
- Polaritons (projection) [153]
- DARWIN (projection) [154]
- LZ (projection) [155]
- QUAX [156, 157]
- Semiconductors (projection) [158]
- White dwarf hint [159]
- Freeze-in irreducible axions [123]
- X-rays (1-loop decay) [160]

4 Axion-nucleon

Note: CASPER and nEDM limits account for stochastic correction reported in [161]

- CASPER-ZULF-Comagnetometer [162]
- CASPER-ZULF-Sidechain [163]
- nEDM (ultracold neutrons and mercury) [164]
- NASDUCK [165, 166]
- PSI HgM [167]
- K-3He comagnetometer (fifth force) [168]
- K-3He comagnetometer (dark matter) [169]
- JEDI [170]
- Old comagnetometers [171]
- Torsion balance [172]
- Neutron star cooling [173] (corrected from [174])
- SN1987A Cooling [175]
- SNO (deuterium dissasociation) [176]
- Proton storage ring (projection) [177]
- DM comagnetometer (projection) [171]
- CASPER-gradient (projection) [163]
- Superfluid helium-3 HPD [178]

5 Axion-EDM

- Beam EDM [179]
- BBN (dark matter) [180]
- CASPER-electric [181]
- nEDM [164]
- HfF⁺ [182]
- JEDI [170]
- Rb/Quartz [183]
- SN1987A [184]
- *Planck*+BAO thermal axion bound [185]
- CASPER-electric (projection) [186]
- Storage Ring EDM (projection) [186]

6 Axion mass versus f_a

- BBN (dark matter) [180]
- Beam EDM [179]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [187]. I include minor numerical corrections made by [188, 189].
- GW170817 [190]
- HfF⁺ [182]
- Rb/Quartz [183]
- JEDI [170]
- nEDM [164]
- Piezoaxionic effect (projection) [191]
- *Planck*+BAO thermal axion bound [185]
- SN1987A [184]
- Neutron stars (projection) [187].
- NS-NS and NS-BH Inspirals (projection) [187].
- White dwarfs [192]

6.1 Black hole superradiance

- Baryakhtar et al. [193] (just Stellar mass BHs)
- Mehta et al. [193] (Stellar mass and SMBHs)
- Stott [194]
- Ünal et al. [195] (Quasars)
- Cardoso et al. [196] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [197]
- Buschmann et al. 2020 [198]
- Buschmann et al. 2021 [199]
- Bonati et al. [200]
- Borsanyi et al. [201]
- Berkowitz et al. [202]
- Dine et al. [203]
- Petreczky et al. [204]
- Fleury & Moore [205]
- Klaer & Moore [206]

7.2 Other dark matter predictions

- ALP Cogenesis [207]
- Early matter domination [208]
- Post-inflation ALP misalignment [209, 210]
- Trapped misalignment (\mathcal{Z}_N axion) [188]

8 CP-violating couplings

Combined constraints [211]

Scalar-nucleon

- Red giants [212]
- MICROSCOPE [213].
- Eot-Wash [214, 215, 216]
- Irvine [217]. Corrected to 2σ limit by [218]
- HUST [219, 220, 221, 222].
- Stanford [223]
- IUPUI [224].
- Wuhan [218]

Pseudoscalar-electron

- Red giants [212]
- Eot-wash [225]
- NIST [226]
- SMILE [227].
- QUAX [228, 229]
- Washington [230, 231].
- XENONIT [232]
- Magnon (projection) [153]
- QUAX (projection) [228].

Pseudoscalar-nucleon

- Neutron star cooling [174]
- Washington [233]. Limit taken from [234].
- SMILE [227].
- Mainz [235]
- ARIADNE (projection) [236]
- CASPER-wind (projection) [186]
- DM comagnetometer (projection) [171]

9 Scalars

Scalar-photon

- Globular clusters [85]
- Eot-Wash (EP) [237]
- Fifth force [238]
- MICROSCOPE [213]
- AURIGA [239]
- BACON [240]
- Cs/Cav [241]
- DAMNED [242]
- Dy/Dy [243]
- Dy/Quartz [183]
- Dynamic Decoupling [244]
- GEO600 [245]
- Holometer [246]
- H/Quartz/Sapphire [247]
- PTB (Yb+, Sr clock) [248]
- I₂ [249]
- Rb/Cs [250]
- Sr/Si [251]
- AEDGE (projection) [252]
- AION (projection) [252]
- DUAL (projection) [238]
- MAGIS (projection) [253]
- Nuclear clock (projection) [254]
- Mechanical Resonators (projection) [255]

Scalar-electron

- Red giants [212]
- Eot-Wash (EP) [237]
- Fifth force [238]
- MICROSCOPE [213]
- AURIGA [239]
- Cs/Cav [241]
- DAMNED [242]
- GEO600 [245]
- Holometer [246]
- H/Quartz/Sapphire [247]
- I₂ [249]
- H/Si [251]
- Rb/Quartz [183]
- AEDGE (projection) [252]
- AION (projection) [252]
- DUAL (projection) [238]
- Optical microwave clock (projection) [238]
- Optical cavities [256]
- SrOH [257]
- Mechanical Resonators (projection) [255]
- IPTA (mock data) [258]

10 Vectors

B-L coupling

- Casimir [259, 260, 261]
- Eot-Wash (EP) [237]
- Eot-Wash (ISL) [262]
- MICROSCOPE [263]
- DM stability [264]
- Horizontal branch [212]
- Sun [212]
- Eot-Wash (DM) [265]
- LIGO (O1) [266]
- LIGO/VIRGO [266]
- Asteroids (projection) [267]
- LISA (projection) [267]
- MAGIS (projection) [253]
- Optomechanical membranes (projection) [268]
- SKA (projection) [269]
- Torsion balance (projection) [269]

11 Dark photons

Combined constraints [270]

SM photon-DP transitions

- Coulomb [271, 272, 273, 274, 275],
- Plimpton & Lawton's experiment [276, 275]
- Atomic spectroscopy [277]
- Atomic force microscopy (AFM) [275]
- Static magnetic field of the Earth [278, 279, 280]
- Static magnetic field of Jupiter [281, 280].
- ALPs [54]
- SPring-8 [282]
- UWA-LSW [283, 284]
- ADMX-LSW [285]
- CROWS [57].
- TEXONO [286]
- Crab nebula [287]
- COBE and FIRAS [288]

Production in stars

- CAST [289]
- SHIP [290]
- HINODE [291]
- HB and RG stars [292]
- Neutron stars [293]
- Solar neutrinos [294]
- XENON1T [295]

Dark matter cosmology/astro

- Arias et al. [209]
- Witte et al. [296, 297]
- Caputo et al. [298, 288],
- IGM [299],
- Leo T dwarf [300]
- Gas clouds [301]

Dark matter experiments

- Reinterpreted axion limits [270]
- BREAD (projection) [40]
- DAMIC [302]
- Dark E-field Radio [303]
- DM Pathfinder [304]
- DOSUE-RR [305]
- FAST Radio antenna [306]
- FUNK [307]
- LAMPOST [308]
- LOFAR (solar corona) [309]
- MuDHI [310]
- ORGAN [311]
- ORPHEUS [312]
- QUALIPHIDE [313]
- Quantum cyclotron [314]
- SENSEI [315]
- SHUKET [316]
- SuperCDMS [317]
- SuperMAG [318, 319]
- SQuAD [320],
- SQMS [321],
- Tokyo dish antennae experiments [322, 323, 324]
- WISPDMS [325]
- XENON(100,1T,nT) [158, 232, 326, 327, 295, 328].

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