References for AxionLimits webpage

Ciaran A. J. O'Hare

ARC Centre of Excellence for Dark Matter Particle Physics
The University of Sydney, Camperdown, NSW 2006, Australia

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+$N_{\rm eff}$ [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, 137]
- CONUS (projection) [138]
- DUNE (projection) [139]
- FASER LLP (projection) [140]

3 Axion-electron

- EDELWEISS [141]
- Magnon non-demolition [142]
- GERDA [143]
- LUX [144]
- Panda-X [145]
- SuperCDMS [146]
- XENON1T [147, 148]
- XENONnT [149]
- XENON1T (Solar basin) [150]
- Red giants (ωCen) [151]
- Solar neutrinos [152]
- Magnons (projection) [153]
- Polaritons (projection) [154]
- DARWIN (projection) [155]
- LZ (projection) [156]
- QUAX [157, 158]
- Semiconductors (projection) [159]
- White dwarf hint [160]
- Freeze-in irreducible axions [123]
- X-rays (1-loop decay) [161]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [162]

- Casimir effect (fifth force) [163]
- CASPEr-ZULF-Comagnetometer [164]
- CASPEr-ZULF-Sidechain [165]
- nEDM (ultracold neutrons and mercury) [166]
- NASDUCK [167, 168]
- PSI HgM [169]
- K-3He comagnetometer (fifth force) [170]
- K-3He comagnetometer (dark matter) [171]
- JEDI [172]
- Old comagnetometers [173]
- Torsion balance [174]
- Neutron star cooling [175] (corrected from [176])
- SN1987A Cooling [177]
- SNO (deuterium dissasociation) [178]
- Proton storage ring (projection) [179]
- DM comagnetometer (projection) [173]
- CASPEr-gradient (projection) [165]
- Superfluid helium-3 HPD (projection) [180]

5 Axion-EDM

- Beam EDM [181]
- BBN (dark matter) [182]
- CASPEr-electric [183]
- nEDM [166]
- HfF^+ [184]
- JEDI [172]
- Rb/Quartz [185]
- SN1987A [186]
- *Planck*+BAO thermal axion bound [187]
- CASPEr-electric (projection) [188]
- Storage Ring EDM (projection) [188]

6 Axion mass versus f_a

- BBN (dark matter) [182]
- Beam EDM [181]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [189]. I include minor numerical corrections made by [190, 191].
- GW170817 [192]
- HfF^+ [184]
- Rb/Quartz [185]
- JEDI [172]
- nEDM [166]
- Piezoaxionic effect (projection) [193]
- *Planck*+BAO thermal axion bound [187]
- SN1987A [186]
- Neutron stars (projection) [189].
- NS-NS and NS-BH Inspirals (projection) [189].
- White dwarfs [194]

6.1 Black hole superradiance

- Baryakhtar et al. [195] (just Stellar mass BHs)
- Mehta et al. [195] (Stellar mass and SMBHs)
- Stott [196]
- Ünal et al. [197] (Quasars)
- Cardoso et al. [198] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [199]
- Buschmann et al. 2020 [200]
- Buschmann et al. 2021 [201]
- Bonati et al. [202]
- Borsanyi et al. [203]
- Berkowitz et al. [204]
- Dine et al. [205]
- Petreczky et al. [206]
- Fleury & Moore [207]
- Klaer & Moore [208]

7.2 Other dark matter predictions

- ALP Cogenesis [209]
- Early matter domination [210]
- Post-inflation ALP misalignment [211, 212]
- Trapped misalignment ($\mathcal{Z}_N$ axion) [190]

8 CP-violating couplings

Combined constraints [213]

Scalar-nucleon

- Red giants [214]
- MICROSCOPE [215].
- Eot-Wash [216, 217, 218]
- Irvine [219]. Corrected to 2σ limit by [220]
- HUST [221, 222, 223, 224].
- Stanford [225]
- IUPUI [226].
- Wuhan [220]

Pseudoscalar-electron

- Red giants [214]
- Eot-wash [227]
- NIST [228]
- SMILE [229].
- QUAX [230, 231]
- Washington [232, 233].
- XENON1T [234]
- Magnon (projection) [154]
- QUAX (projection) [230].

Pseudoscalar-nucleon

- Neutron star cooling [176]
- Washington [235]. Limit taken from [236].
- SMILE [229].
- Mainz [237]
- ARIADNE (projection) [238]
- CASPEr-wind (projection) [188]
- DM comagnetometer (projection) [173]

9 Scalars

Scalar-photon

- Globular clusters [85]
- Eot-Wash (EP) [239]
- Fifth force [240]
- MICROSCOPE [215]
- AURIGA [241]
- BACON [242]
- Cs/Cav [243]
- DAMNED [244]
- Dy/Dy [245]
- Dy/Quartz [185]
- Dynamic Decoupling [246]
- GEO600 [247]
- Holometer [248]
- H/Quartz/Sapphire [249]
- PTB (Yb+, Sr clock) [250]
- I_2 [251]
- Rb/Cs [252]
- Sr/Si [253]
- AEDGE (projection) [254]
- AION (projection) [254]
- DUAL (projection) [240]
- MAGIS (projection) [255]
- Nuclear clock (projection) [256]
- Mechanical Resonators (projection) [257]

Scalar-electron

- Red giants [214]
- Eot-Wash (EP) [239]
- Fifth force [240]
- MICROSCOPE [215]
- AURIGA [241]
- Cs/Cav [243]
- DAMNED [244]
- GEO600 [247]
- Holometer [248]
- H/Quartz/Sapphire [249]
- I_2 [251]
- H/Si [253]
- Rb/Quartz [185]
- AEDGE (projection) [254]
- AION (projection) [254]
- DUAL (projection) [240]
- Optical microwave clock (projection) [240]
- Optical cavities [258]
- SrOH [259]
- Mechanical Resonators (projection) [257]
- IPTA (mock data) [260]

10 Vectors

B-L coupling

- Casimir [261, 262, 263]
- Eot-Wash (EP) [264]
- Eot-Wash (ISL) [265]
- MICROSCOPE [266]
- DM stability [267]
- Horizontal branch [214]
- Sun [214]
- Eot-Wash (DM) [268]
- LIGO (O1) [269]
- LIGO/VIRGO [269]
- Asteroids (projection) [270]
- LISA (projection) [270]
- MAGIS (projection) [255]
- Optomechanical membranes (projection) [271]
- SKA (projection) [272]
- Torsion balance (projection) [272]

11 Dark photons

Combined constraints [273]

SM photon-DP transitions

- Coulomb [274, 275, 276, 277, 278],
- Plimpton & Lawton's experiment [279, 278]
- Atomic spectroscopy [280]
- Atomic force microscopy (AFM) [278]
- Static magnetic field of the Earth [281, 282, 283]
- Static magnetic field of Jupiter [284, 283].
- ALPs [54]
- SPring-8 [285]
- UWA-LSW [286, 287]
- ADMX-LSW [288]
- CROWS [57].
- DarkSRF [289]
- TEXONO [290]
- Crab nebula [291]
- COBE and FIRAS [292]

Production in stars

- CAST [293]
- SHIP [294]
- HINODE [295]
- HB and RG stars [296]
- Neutron stars [297]
- Solar neutrinos [298]
- XENON1T [299]

Dark matter cosmology/astro

- Arias et al. [211]
- Witte et al. [300, 301]
- Caputo et al. [302, 292],
- IGM [303],
- Leo T dwarf [304]
- Gas clouds [305]

Dark matter experiments

- Reinterpreted axion limits [273]
- BREAD (projection) [40]
- DAMIC [306]
- Dark E-field Radio [307]
- DM Pathfinder [308]
- DOSUE-RR [309]
- FAST Radio antenna [310]
- FUNK [311]
- LAMPOST [312]
- LOFAR (solar corona) [313]
- MuDHI [314]
- ORGAN [315]
- ORPHEUS [316]
- QUALIPHIDE [317]
- Quantum cyclotron [318]
- SENSEI [319]
- SHUKET [320]
- SuperCDMS [321]
- SuperMAG [322, 323]
- SQuAD [324],
- SQMS [325],
- Tokyo dish antennae experiments [326, 327, 328]
- WISPDMX [329]
- XENON(100,1T,nT) [159, 234, 330, 331, 299, 332].

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