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]
- DANCE [17]
- BASE [18]
- GrAHal [19]
- HAYSTAC [20, 21, 22]
- ORGAN [23, 24]
- QUAX [25, 26, 27]
- RADES [28]
- RBF [29]
- SHAFT [30]
- TASEH [31]
- SuperMAG [32]
- UF [33]
- UPLOAD-DOWNLOAD [34, 35]
- ABRACADABRA (projection) [36]
- ADBC (projection) [37]
- ADMX (projection) [38]
- aLIGO (projection) [39]
- ALPHA (projection) [40, 41]
- BRASS (projection) [42]
- BREAD (projection) [43]
- CADEx (projection) [44]
- DALI (projection) [45]
- DM-Radio (projection) [46, 47]
- DANCE (projection) [48]
- LAMPOST (projection) [49]
- MADMAX (projection) [50]
- FLASH (projection) [51, 52]
- QUAX (projection) [53]
- ORGAN (projection) [23]
- TOORAD (projection) [54]
- Twisted Anyon Cavity (projection) [55]
- WISPLC (projection) [56]
- SRF heterodyne cavity (projection) [57]

LSW/Helioscopes

- ALPS [58]
- CAST [59, 60]
- CROWS [61]
- OSQAR [62]
- PVLAS [63]
- SAPPHIRES [64, 65]
- ALPS-II (projection) [66]
- IAXO (projection) [67]
- IAXO (Galactic SN) [68]

Astro

- Axion star explosions [69]
- Betelgeuse [70]
- BICEP/KECK [71]
- Breakthrough Listen (Doppler shifted radio line in MW) [72]
- Bullet Cluster (archival radio data) [73]
- Cosmic IR background (hint) [74]
- Chandra (Hydra) [75]
- Chandra (M87) [76]
- Chandra (NG7 1275) [77]
- Chandra (H1821+643) [78]
- CMB Anisotropies [79, 80]
- COBE/FIRAS+Planck spectral dist. [81]
- Diffuse gamma-rays [82]
- Diffuse SN ALPs [83] (see also [84])
- Distance ladder [85]
- Fermi-LAT (NGC 1275) [86]
- Fermi-LAT (Extragalactic SNe) [87]
- Fermi-LAT (Quasars) [88]
- Gamma-ray attenuation (ALP dark matter) [89]
- Globular clusters (R parameter) [90]
- Globular clusters (R_2 parameter) [91]
- HAWC (TeV Blazars) [92]
- HESS (PKS 2155-304) [93]
- INTEGRAL (ALP decay) [94]
- Leo T gas temperature [95]
- Magnetic white dwarfs (X-rays) [96]
- Magnetic white dwarf (polarization) [97]
- MOJAVE [98]
- Mrk 421 (ARGO-YBJ+Fermi): [99]
- Mrk 421 (ARGO-YBJ+MAGIC): [100]
- Neutron Stars (Foster et al. 2020) [101]
- Neutron Stars (Darling 2020) [102]
- Neutron Stars (Battye et al. 2021) [103]
- Neutron stars (Foster et al. 2022) [104]
- Neutron Stars (Battye et al. 2023) [105]
- NuSTAR (decaying dark matter, recast from Sterile nu) [106, 107, 108]
- Planck cosmic birefringence [109]
- POLARBEAR [110]
- PPTA+QUIJOTE [111]
- Pulsar polarisation arrays (projection) [112]
- Pulsar polar cap [113]
- Red supergiant [114]
- Solar neutrinos [115]
- SN1987A-γ (ALP decay) [116, 117, 118]
- SN1987A-γ (low mass ALP conversion) [119, 117]
- SN1987A-γ,ν (high mass ALPs) [120, 121]
- Low-energy supernovae (ALP decay) [82]
- Solar basin (NuSTAR) [122]
- Solar basin (NuSTAR and SPHINX) [123]
- Star clusters [124]
- SPT [125]
- Telescopes (Haystack) [126]
- Telescopes (MUSE) [127]
- Telescopes (VIMOS) [128]
- Telescopes (HST) [129, 130]
- Fermi galactic SN (projection) [131]
- THESEUS (projection) [132]
- eROSITA (projection) [133]
- White dwarf initial-final mass relation [134]
- XMM-Newton (decaying DM ALPs) [135]

Cosmology

- Ionisation fraction, EBL, X-rays [136]
- BBN+$N_{\rm eff}$ [137]
- Freeze in [138]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [139]
- BaBar [140]
- Beam dump [141, 142, 140, 143, 144]
- Belle II [145]
- BESIII [146]
- CMS (PbPb) [147]
- LEP [148]
- LHC (pp)[149]
- NOMAD [150]
- OPAL [149]
- PrimEx [151, 152]
- CONUS (projection) [153]
- DUNE (projection) [154]
- FASER LLP (projection) [155]

3 Axion-electron

- EDELWEISS [156]
- Magnon non-demolition [157]
- DarkSide-50 [158]
- GERDA [159]
- LUX [160]
- Panda-X [161]
- SuperCDMS [162]
- XENON1T [163, 164]
- XENONnT [165]
- XENON1T (Solar basin) [166]
- Red giants (ωCen) [167]
- NV Centers (projection) [168]
- Solar neutrinos [169]
- Magnons (projection) [170]
- Polaritons (projection) [171]
- DARWIN (projection) [172]
- LZ (projection) [173]
- QUAX [174, 175]
- Semiconductors (projection) [176]
- White dwarf hint [177]
- Freeze-in irreducible axions [138]
- X-rays (1-loop decay) [178]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [179]

- Casimir effect (fifth force) [180]
- CASPEr-ZULF-Comagnetometer [181]
- CASPEr-ZULF-Sidechain [182]
- nEDM (ultracold neutrons and mercury) [183]
- NASDUCK [184, 185]
- PSI HgM (nEDM) [186]
- K-3He comagnetometer (fifth force) [187]
- K-3He comagnetometer (dark matter) [188]
- JEDI [189]
- Old comagnetometers [190]
- Torsion balance [191]
- Neutron star cooling [192] (corrected from [193])
- SN1987A Cooling [194]
- SNO (deuterium dissasociation) [195]
- Proton storage ring (projection) [196]
- Electrostatic storage ring (projection) [197]
- DM comagnetometer (projection) [190]
- CASPEr-gradient (projection) [182]
- Superfluid helium-3 HPD (projection) [198]

5 Axion-EDM

- Axinovae [199]
- Beam EDM [200]
- BBN (dark matter) [201]
- CASPEr-electric [202]
- nEDM [183]
- HfF$^+$ [203]
- JEDI [189]
- Rb/Quartz [204]
- SN1987A [205]
- *Planck*+BAO thermal axion bound [206]
- CASPEr-electric (projection) [207]
- Storage Ring EDM (projection) [207]

6 Axion mass versus f_a

- BBN (dark matter) [201]
- Beam EDM [200]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [208]. I include minor numerical corrections made by [209, 210].
- GW170817 [211]
- HfF$^+$ [203]
- Rb/Quartz [204]
- JEDI [189]
- nEDM [183]
- Piezoaxionic effect (projection) [212]
- *Planck*+BAO thermal axion bound [206]
- SN1987A [205]
- Neutron stars (projection) [208].
- NS-NS and NS-BH Inspirals (projection) [208].
- White dwarfs [213]

6.1 Black hole superradiance

- Baryakhtar et al. [214] (just Stellar mass BHs)
- Mehta et al. [214] (Stellar mass and SMBHs)
- Stott [215]
- Ünal et al. [216] (Quasars)
- Cardoso et al. [217] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [218]
- Buschmann et al. 2020 [219]
- Buschmann et al. 2021 [220]
- Bonati et al. [221]
- Borsanyi et al. [222]
- Berkowitz et al. [223]
- Dine et al. [224]
- Petreczky et al. [225]
- Fleury & Moore [226]
- Klaer & Moore [227]
- Gorghetto et al. [228]
- Saikawa et al. [67]

7.2 Other dark matter predictions

- ALP Cogenesis [229]
- Early matter domination [230]
- Post-inflation ALP misalignment [231, 232]
- Trapped misalignment ($\mathcal{Z}_\mathcal{N}$ axion) [209]

8 CP-violating couplings

Combined constraints [233]

Scalar-nucleon

- Red giants [234]
- MICROSCOPE [235].
- Eot-Wash [236, 237, 238]
- Irvine [239]. Corrected to 2σ limit by [240]
- HUST [241, 242, 243, 244].
- Stanford [245]
- IUPUI [246].
- Wuhan [240]

Pseudoscalar-electron

- Red giants [234]
- Eot-wash [247]
- NIST [248]
- SMILE [249].
- QUAX [250, 251, 252]
- Washington [253, 254].
- XENON1T [255]
- Magnon (projection) [171]
- QUAX (projection) [250].

Pseudoscalar-nucleon

- Neutron star cooling [192]
- Hefei (Earth) [256]
- Hefei (mm) [257]
- Washington [258]. Limit taken from [259].
- SMILE [249].
- Mainz [260]
- Moon/Sun [261]
- ARIADNE (projection) [262]
- CASPEr-wind (projection) [207]
- DM comagnetometer (projection) [190]
- Fifth force Ne-Rb-K comagnetometer (projection) [263]

9 Scalars

Scalar-photon

- Globular clusters [91]
- Eot-Wash (EP) [264]
- Fifth force [265, 266, 267, 268]
- MICROSCOPE [235]
- AURIGA [269]
- BACON [270]
- Cs/Cav [271]
- DAMNED [272]
- Dy/Dy [273]
- Dy/Quartz [204]
- Dynamic Decoupling [274]
- GEO600 [275]
- LIGO O3 [276]
- Holometer [277]
- H/Quartz/Sapphire [278]
- PTB (Yb+, Sr clock) [279]
- I_2 [280]
- Rb/Cs [281]
- Sr/Si [282]
- Yb/Sr [283]
- AEDGE (projection) [284]
- AION (projection) [284]
- DUAL (projection) [285]
- MAGIS (projection) [286]
- Nuclear clock (projection) [287]
- Mechanical Resonators (projection) [288]

Scalar-electron

- Red giants [234]
- White dwarfs [289]
- Eot-Wash (EP) [264]
- Fifth force [265, 266, 267, 268]
- MICROSCOPE [235]
- AURIGA [269]
- Cs/Cav [271]
- DAMNED [272]
- GEO600 [275]
- Holometer [277]
- H/Quartz/Sapphire [278]
- I_2 [280]
- H/Si [282]
- Rb/Quartz [204]
- Yb/Cs [290]
- LIGO O3 [276]
- FOCOS (nuclear clock projection) [291]
- AEDGE (projection) [284]
- AION (projection) [284]
- DUAL (projection) [285]
- Optical microwave clock (projection) [292]
- Optical cavities [293]
- SrOH [294]
- Mechanical Resonators (projection) [288]
- IPTA (mock data) [295]

10 Vectors

B-L coupling

- Casimir [296, 297, 298]
- Eot-Wash (EP) [299]
- Eot-Wash (ISL) [300]
- MICROSCOPE [301]
- DM stability [302]
- Horizontal branch [234]
- Sun [234]
- Eot-Wash (DM) [303]
- LIGO (O1) [304]
- LIGO/VIRGO [304]
- LISA Pathfinder [305]
- PPTA [306]
- Asteroids (projection) [307]
- LISA (projection) [307]
- MAGIS (projection) [286]
- Optomechanical membranes (projection) [308]
- SKA (projection) [309]
- Torsion balance (projection) [309]
- STE-QUEST (projection) [310]

11 Dark photons

Combined constraints [311]

SM photon-DP transitions

- Coulomb [312, 313, 314, 315, 316],
- Plimpton & Lawton's experiment [317, 316]
- Atomic spectroscopy [318]
- Atomic force microscopy (AFM) [316]
- Static magnetic field of the Earth [319, 320, 321]
- Static magnetic field of Jupiter [322, 321].
- ALPs [58]
- ALPS-II (projection) [323]
- SPring-8 [324]
- UWA-LSW [325, 326]
- ADMX-LSW [327]
- CROWS [61].
- DarkSRF [328]
- DarkSRF (projection) [329]
- TEXONO [330]
- Crab nebula [331]
- COBE and FIRAS [332]
- STAX (projection) [333]

Production in stars

- CAST [334]
- SHIPS [335]
- HINODE [336]
- HB and RG stars [337]
- Neutron stars [338]
- Solar neutrinos [339]
- XENON1T [340]

Dark matter cosmology/astro

- Arias et al. [231]
- Witte et al. [341, 342]
- Caputo et al. [343, 332],
- IGM [344],
- Leo T dwarf [345]
- Gas clouds [346]

Dark matter experiments

- Reinterpreted axion limits [311]
- ALPHA [41]
- BREAD (projection) [43]
- DarkSide-50 [158]
- DAMIC [347]
- Dark E-field Radio [348]
- DM Pathfinder [349]
- DOSUE-RR [350]
- FAST Radio antenna [351]
- FUNK [352]
- LAMPOST [353]
- LOFAR (solar corona) [354]
- MuDHI [355]
- ORGAN [356]
- ORPHEUS [357]
- QUALIPHIDE [358]
- Quantum cyclotron [359]
- SENSEI [360]
- SHUKET [361]
- SuperCDMS [362]
- SuperMAG [363, 364]
- SQuAD [365],
- SQMS [366],
- Tokyo dish antennae experiments [367, 368, 369]
- WISPDMX [370]
- XENON(100,1T,nT) [176, 255, 371, 372, 340, 373].

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