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

Cosmology

- Ionisation fraction, EBL, X-rays [127]
- BBN+$N_{\rm eff}$ [128]
- Freeze in [129]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [130]
- BaBar [131]
- Beam dump [132, 133, 131, 134, 135]
- Belle II [136]
- BESIII [137]
- CMS (PbPb) [138]
- LEP [139]
- LHC (pp)[140]
- NOMAD [141]
- OPAL [140]
- PrimEx [142, 143]
- CONUS (projection) [144]
- DUNE (projection) [145]
- FASER LLP (projection) [146]

3 Axion-electron

- EDELWEISS [147]
- Magnon non-demolition [148]
- GERDA [149]
- LUX [150]
- Panda-X [151]
- SuperCDMS [152]
- XENON1T [153, 154]
- XENONnT [155]
- XENON1T (Solar basin) [156]
- Red giants (ωCen) [157]
- NV Centers (projection) [158]
- Solar neutrinos [159]
- Magnons (projection) [160]
- Polaritons (projection) [161]
- DARWIN (projection) [162]
- LZ (projection) [163]
- QUAX [164, 165]
- Semiconductors (projection) [166]
- White dwarf hint [167]
- Freeze-in irreducible axions [129]
- X-rays (1-loop decay) [168]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [169]

- Casimir effect (fifth force) [170]
- CASPEr-ZULF-Comagnetometer [171]
- CASPEr-ZULF-Sidechain [172]
- nEDM (ultracold neutrons and mercury) [173]
- NASDUCK [174, 175]
- PSI HgM (nEDM) [176]
- K-3He comagnetometer (fifth force) [177]
- K-3He comagnetometer (dark matter) [178]
- JEDI [179]
- Old comagnetometers [180]
- Torsion balance [181]
- Neutron star cooling [182] (corrected from [183])
- SN1987A Cooling [184]
- SNO (deuterium dissasociation) [185]
- Proton storage ring (projection) [186]
- DM comagnetometer (projection) [180]
- CASPEr-gradient (projection) [172]
- Superfluid helium-3 HPD (projection) [187]

5 Axion-EDM

- Axinovae [188]
- Beam EDM [189]
- BBN (dark matter) [190]
- CASPEr-electric [191]
- nEDM [173]
- HfF^+ [192]
- JEDI [179]
- Rb/Quartz [193]
- SN1987A [194]
- *Planck*+BAO thermal axion bound [195]
- CASPEr-electric (projection) [196]
- Storage Ring EDM (projection) [196]

6 Axion mass versus f_a

- BBN (dark matter) [190]
- Beam EDM [189]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [197]. I include minor numerical corrections made by [198, 199].
- GW170817 [200]
- HfF^+ [192]
- Rb/Quartz [193]
- JEDI [179]
- nEDM [173]
- Piezoaxionic effect (projection) [201]
- *Planck*+BAO thermal axion bound [195]
- SN1987A [194]
- Neutron stars (projection) [197].
- NS-NS and NS-BH Inspirals (projection) [197].
- White dwarfs [202]

6.1 Black hole superradiance

- Baryakhtar et al. [203] (just Stellar mass BHs)
- Mehta et al. [203] (Stellar mass and SMBHs)
- Stott [204]
- Ünal et al. [205] (Quasars)
- Cardoso et al. [206] (dark photon)

7 Axion theory predictions

7.1 Post-inflation QCD axion

- Ballesteros et al. [207]
- Buschmann et al. 2020 [208]
- Buschmann et al. 2021 [209]
- Bonati et al. [210]
- Borsanyi et al. [211]
- Berkowitz et al. [212]
- Dine et al. [213]
- Petreczky et al. [214]
- Fleury & Moore [215]
- Klaer & Moore [216]
- Gorghetto et al. [217]
- Saikawa et al. [67]

7.2 Other dark matter predictions

- ALP Cogenesis [218]
- Early matter domination [219]
- Post-inflation ALP misalignment [220, 221]
- Trapped misalignment ($\mathcal{Z}_N$ axion) [198]

8 CP-violating couplings

Combined constraints [222]

Scalar-nucleon

- Red giants [223]
- MICROSCOPE [224].
- Eot-Wash [225, 226, 227]
- Irvine [228]. Corrected to 2σ limit by [229]
- HUST [230, 231, 232, 233].
- Stanford [234]
- IUPUI [235].
- Wuhan [229]

Pseudoscalar-electron

- Red giants [223]
- Eot-wash [236]
- NIST [237]
- SMILE [238].
- QUAX [239, 240]
- Washington [241, 242].
- XENON1T [243]
- Magnon (projection) [161]
- QUAX (projection) [239].

Pseudoscalar-nucleon

- Neutron star cooling [183]
- Washington [244]. Limit taken from [245].
- SMILE [238].
- Mainz [246]
- ARIADNE (projection) [247]
- CASPEr-wind (projection) [196]
- DM comagnetometer (projection) [180]

9 Scalars

Scalar-photon

- Globular clusters [90]
- Eot-Wash (EP) [248]
- Fifth force [249]
- MICROSCOPE [224]
- AURIGA [250]
- BACON [251]
- Cs/Cav [252]
- DAMNED [253]
- Dy/Dy [254]
- Dy/Quartz [193]
- Dynamic Decoupling [255]
- GEO600 [256]
- Holometer [257]
- H/Quartz/Sapphire [258]
- PTB (Yb+, Sr clock) [259]
- I_2 [260]
- Rb/Cs [261]
- Sr/Si [262]
- AEDGE (projection) [263]
- AION (projection) [263]
- DUAL (projection) [249]
- MAGIS (projection) [264]
- Nuclear clock (projection) [265]
- Mechanical Resonators (projection) [266]

Scalar-electron

- Red giants [223]
- White dwarfs [267]
- Eot-Wash (EP) [248]
- Fifth force [249]
- MICROSCOPE [224]
- AURIGA [250]
- Cs/Cav [252]
- DAMNED [253]
- GEO600 [256]
- Holometer [257]
- H/Quartz/Sapphire [258]
- I_2 [260]
- H/Si [262]
- Rb/Quartz [193]
- AEDGE (projection) [263]
- AION (projection) [263]
- DUAL (projection) [249]
- Optical microwave clock (projection) [249]
- Optical cavities [268]
- SrOH [269]
- Mechanical Resonators (projection) [266]
- IPTA (mock data) [270]

10 Vectors

B-L coupling

- Casimir [271, 272, 273]
- Eot-Wash (EP) [274]
- Eot-Wash (ISL) [275]
- MICROSCOPE [276]
- DM stability [277]
- Horizontal branch [223]
- Sun [223]
- Eot-Wash (DM) [278]
- LIGO (O1) [279]
- LIGO/VIRGO [279]
- Asteroids (projection) [280]
- LISA (projection) [280]
- MAGIS (projection) [264]
- Optomechanical membranes (projection) [281]
- SKA (projection) [282]
- Torsion balance (projection) [282]

11 Dark photons

Combined constraints [283]

SM photon-DP transitions

- Coulomb [284, 285, 286, 287, 288],
- Plimpton & Lawton's experiment [289, 288]
- Atomic spectroscopy [290]
- Atomic force microscopy (AFM) [288]
- Static magnetic field of the Earth [291, 292, 293]
- Static magnetic field of Jupiter [294, 293].
- ALPs [58]
- ALPS-II (projection) [295]
- SPring-8 [296]
- UWA-LSW [297, 298]
- ADMX-LSW [299]
- CROWS [61].
- DarkSRF [300]
- DarkSRF (projection) [301]
- TEXONO [302]
- Crab nebula [303]
- COBE and FIRAS [304]
- STAX (projection) [305]

Production in stars

- CAST [306]
- SHIPS [307]
- HINODE [308]
- HB and RG stars [309]
- Neutron stars [310]
- Solar neutrinos [311]
- XENON1T [312]

Dark matter cosmology/astro

- Arias et al. [220]
- Witte et al. [313, 314]
- Caputo et al. [315, 304],
- IGM [316],
- Leo T dwarf [317]
- Gas clouds [318]

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Dark matter experiments

- Reinterpreted axion limits [283]
- ALPHA []
- BREAD (projection) [43]
- DAMIC [319]
- Dark E-field Radio [320]
- DM Pathfinder [321]
- DOSUE-RR [322]
- FAST Radio antenna [323]
- FUNK [324]
- LAMPOST [325]
- LOFAR (solar corona) [326]
- MuDHI [327]
- ORGAN [328]
- ORPHEUS [329]
- QUALIPHIDE [330]
- Quantum cyclotron [331]
- SENSEI [332]
- SHUKET [333]
- SuperCDMS [334]
- SuperMAG [335, 336]
- SQuAD [337],
- SQMS [338],
- Tokyo dish antennae experiments [339, 340, 341]
- WISPDMX [342]
- XENON(100,1T,nT) [166, 243, 343, 344, 312, 345].

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