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]
- ADBC [3]
- ADMX [4, 5, 6, 7, 8]
- ADMX-Sidecar [9, 10]
- ADMX-SLIC [11]
- CAPP [12, 13, 14, 15, 16, 17, 18, 19, 20, 21]
- CAST-CAPP [22]
- DANCE [23]
- BASE [24]
- GrAHal [25]
- HAYSTAC [26, 27, 28, 29, 30]
- LIDA [31]
- MADMAX [32]
- ORGAN [33, 34, 35, 36]
- QUAX [37, 38, 39, 40, 41]
- RADES [42, 43]
- RBF [44, 45]
- SHAFT [46]
- TASEH [47]
- SuperMAG [48, 49]
- UF [50, 51]
- UPLOAD-DOWNLOAD [52, 53]
- ABRACADABRA (projection) [54]
- ADBC (projection) [55]
- ADMX (projection) [56]
- aLIGO (projection) [57]
- ALPHA (projection) [58, 59]
- BabyIAXO-RADES (projection) [60]
- BRASS (projection) [61]
- BREAD (projection) [62]
- CADEx (projection) [63]
- DALI (projection) [64]
- DarkGEO (projection) [65]
- DM-Radio (projection) [66, 67]
- DANCE (projection) [68]
- LAMPOST (projection) [69]
- MADMAX (projection) [70]
- FLASH (projection) [71, 72]
- QUAX (projection) [73]
- ORGAN (projection) [33]
- TOORAD (projection) [74]
- Twisted Anyon Cavity (projection) [75]
- WISPLC (projection) [76]
- SRF heterodyne cavity (projection) [77]

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- CROWS [82]
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- PVLAS [84]
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- Gamma-ray decay [92]
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- GW170817 (Fermi) [122]
- GW170817 [123]
- HAWC (TeV Blazars) [124]
- HESS (PKS 2155-304) [125]
- INTEGRAL (ALP decay) [126]
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- Magnetic white dwarf (polarization) [132]
- MOJAVE [133]
- Mrk 421 (ARGO-YBJ+Fermi): [134]
- Mrk 421 (ARGO-YBJ+MAGIC): [135]
- Mrk 421 (Fermi+HAWC): [136]
- Neutron Stars (Foster et al. 2020) [137]
- Neutron Stars (Darling 2020) [138]
- Neutron Stars (Battye et al. 2021) [139]
- Neutron stars (Foster et al. 2022) [140]
- Neutron Stars (Battye et al. 2023) [141]
- NuSTAR (decaying dark matter, recast from Sterile nu) [142, 143, 144]
- NuSTAR (Sun) [145]
- Planck cosmic birefringence [146]
- POLARBEAR [147, 148]
- PPTA+QUIJOTE [149]
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- Pulsar polarisation arrays (PPTA analysis) [151]
- Pulsar polar cap [152]
- PSR J0437-4715 polarisation [153]
- Red supergiant [154]
- Solar neutrinos [155]
- Stellar axion background [156]
- SN1987A-γ (ALP decay) [157, 158, 159]
- SN1987A-γ (low mass ALP conversion) [160, 158, 161]
- SN1987A-γ,ν (high mass ALPs) [162, 163, 111]
- SN1987A (PVO) [164]
- Sgr A* [165]
- Low-energy supernovae (ALP decay) [111]
- Solar basin (NuSTAR) [166]
- Solar basin (NuSTAR and SPHINX) [167]
- Super Star clusters [168]
- SPT [169]
- Telescopes (Haystack) [170]

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- Telescopes (VIMOS) [173]
- Telescopes (HST) [174, 175]
- Telescopes (HST-dwarfs) [176]
- Telescopes (JWST) [177]
- Telescopes (WINERED) [178, 179]
- Telescopes (eROSITA) [180]
- Fermi galactic SN (projection) [181]
- THESEUS (projection) [182]
- eROSITA (projection) [183]
- XRISM (projection) [184]
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- XMM-Newton (decaying DM ALPs) [186]

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- BBN+$N_{\rm eff}$ [188]
- Freeze in [189]
- Cosmic background [190]

2 Heavy ALP-photon coupling

- ATALS (PbPb) [191]
- BaBar [192]
- Beam dump [193, 194, 192, 195, 196]
- Belle II [197]
- BESIII [198, 199]
- CMS (PbPb) [200]
- EuXFL [201]
- FASER (limit) [202]
- LEP [203]
- LHC (pp)[204]
- MiniBooNE [205]
- NOMAD [206]
- OPAL [204]
- PrimEx [207, 208]
- GlueX [209]
- CONUS (projection) [210]
- DUNE (projection) [211]
- FASER LLP (projection) [212]

3 Axion-electron

- Electron g-2 [213]
- EDELWEISS [214]
- Fermionic axion interferometer [215]
- Magnon non-demolition [216]
- DarkSide-50 [217]
- GERDA [218]
- LUX [219]
- Old comagnetometers [220]
- Panda-X [221]
- Torsion pendulum (spin force) [222]
- Torsion pendulum (axion wind) [223]
- SuperCDMS [224]
- XENON1T [225, 226]
- XENONnT [227]
- XENON1T (Solar basin) [228]
- Red giants (ωCen) [229]
- Solar neutrinos [230]
- Electron storage ring (projection) [231]
- Axion wind multilayer (projection) [232]
- Magnons (projection) [233]
- Polaritons (projection) [234]
- DARWIN (projection) [235]
- LZ (projection) [236]
- QUAX [237, 238]
- NV Centers (projection) [239]
- Superconductors (projection) [240]
- Semiconductors (projection) [241]
- Spin-orbit coupling (projection) [242]
- Torsion pendulum (projection) [243]
- YIG (projection) [233]
- White dwarf hint [244]
- Freeze-in irreducible axions [189]
- X-rays (1-loop decay) [245]

4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [246]

- Casimir effect (fifth force) [247]
- CASPEr-ZULF-Comagnetometer [248]
- CASPEr-ZULF-Sidechain [249]
- ChangE [250, 251]
- Hefei Spin-based amplifiers [252]
- nEDM (ultracold neutrons and mercury) [253]
- NASDUCK [254, 255]
- PSI HgM (nEDM) [256]
- K-3He comagnetometer (fifth force) [257]
- K-3He comagnetometer (dark matter) [258]
- Mainz-Krakow comagnetometers [259]
- JEDI [260]
- Old comagnetometers [220]
- Torsion balance [261]
- Neutron star cooling [262] (corrected from [263])
- SN1987A Cooling [264, 265]
- Super-Kamiokande diffuse supernova ALPs [266]
- SNO (deuterium dissasociation) [267]
- Proton storage ring (projection) [268]
- Electrostatic storage ring (projection) [231]
- DM comagnetometer (projection) [220]
- CASPEr-gradient (projection) [249]
- Superfluid helium-3 HPD (projection) [269]
- MnCO3 (projection) [270]

5 Axion-EDM

- Axinovae [271]
- Beam EDM [272]
- BBN (dark matter) [273]
- CASPEr-electric [274]
- nEDM [253]
- HfF^+ [275]
- I_2^+/Ca^+ [276]
- JEDI [260]
- ONIX [277]
- Rb/Quartz [278]
- SN1987A [279, 280]
- *Planck*+BAO thermal axion bound [281]
- CASPEr-electric (projection) [282]
- Storage Ring EDM (projection) [282]
- Polarisation haloscope (projection) [283]

6 Axion-top

Axion-top coupling limits originally compiled in Ref. [284, 285]

7 Axion mass versus f_a

- BBN (dark matter) [273]
- Beam EDM [272]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [286]. I include minor numerical corrections made by [287, 288].
- GW170817 [289]
- HfF^+ [275]
- Rb/Quartz [278]
- JEDI [260]
- nEDM [253]
- Tritium decay [290]
- Piezoaxionic effect (projection) [291]
- *Planck*+BAO thermal axion bound [281]
- SN1987A [279]
- Neutron stars (projection) [286].
- NS-NS and NS-BH Inspirals (projection) [286].
- White dwarfs [292]
- Polarisation haloscope (projection) [283]
- Neutron star cooling (Gomez-Banon et al. [293], Kumamoto et al. [294])

7.1 Black hole superradiance

- Baryakhtar et al. [295] (just Stellar mass BHs)
- Mehta et al. [295] (Stellar mass and SMBHs)
- Stott [296]
- Ünal et al. [297] (Quasars)
- Hoof et al. [298]
- Witte and Mummery [299]
- Cardoso et al. [300] (dark photon)

8 Axion theory predictions

8.1 Post-inflation QCD axion

- Ballesteros et al. [301]
- Buschmann et al. 2020 [302]
- Buschmann et al. 2021 [303]
- Benabou et al. 2024 [304]
- Bonati et al. [305]
- Borsanyi et al. [306]
- Berkowitz et al. [307]
- Dine et al. [308]
- Petreczky et al. [309]
- Fleury & Moore [310]
- Klaer & Moore [311]
- Gorghetto et al. [312]
- Saikawa et al. (2019) [89]
- Saikawa et al. (2024) [313]
- Beyer et al. (2023) [314]
- Kim et al. (2024) [315]

8.2 Other dark matter predictions

- ALP Cogenesis [316]
- Early matter domination [317]
- Post-inflation ALP misalignment [318, 319]
- Trapped misalignment ($\mathcal{Z}_N$ axion) [287]

9 CP-violating couplings

Combined constraints [320]

Scalar-nucleon

- Red giants [321]
- MICROSCOPE [322].
- Eot-Wash [323, 324, 325]
- Irvine [326]. Corrected to 2σ limit by [327]
- HUST [328, 329, 330, 331].
- Stanford [332]
- IUPUI [333].
- Wuhan [327]

Pseudoscalar-electron

- Red giants [321]
- Eot-wash [334]
- e^+e^- Penning trap [335]
- NIST [336]
- SMILE [337]
- Perihelion shift [338]
- QUAX [339, 340, 341]
- Washington [222, 342].
- XENON1T [343]
- ACME (projection) [344]
- Magnon (projection) [234]
- QUAX (projection) [339].

Pseudoscalar-nucleon

- Neutron star cooling [262]
- Hefei (Earth) [345]
- Hefei (mm) [346]
- Washington [347]. Limit taken from [348].
- SMILE [337].
- Mainz [349]
- Moon/Sun [350]
- Yb trap (projection) [344]
- ARIADNE (projection) [351]
- CASPEr-wind (projection) [282]
- DM comagnetometer (projection) [220]
- Fifth force Ne-Rb-K comagnetometer (projection) [352]

10 Scalars

Scalar-photon

- Globular clusters [121]
- Eot-Wash (EP) [353]
- Fifth force [354, 355, 356, 357]
- MICROSCOPE [322]
- AURIGA [358]
- BACON [359]
- Cs/Cav [360]
- DAMNED [361]
- Dy/Dy [362]
- Dy/Quartz [278]
- Dynamic Decoupling [363]
- GEO600 [364]
- LIGO O3 [365], see also [366]
- Holometer [367]
- H/Quartz/Sapphire [368]
- PTB (Yb+, Sr clock) [369]
- I_2 [370]
- Rb/Cs [371]
- Sr/Si [372]
- Yb/Sr [373]
- AEDGE (projection) [374]
- AION (projection) [374]
- DUAL (projection) [375]
- MAGIS (projection) [376]
- Nuclear clock (projection) [377]
- Mechanical Resonators (projection) [378]

Scalar-electron

- Red giants [321]
- White dwarfs [379]
- Eot-Wash (EP) [353]
- Fifth force [354, 355, 356, 357]
- MICROSCOPE [322]
- AURIGA [358]
- Cavities [380]
- Cs/Cav [360]
- DAMNED [361]
- GEO600 [364]
- Holometer [367]
- H/Quartz/Sapphire [368]
- LIGO O3 [365], see also [366]
- I_2 [370]
- H/Si [372]
- Rb/Quartz [278]
- Yb/Cs [381]
- NANOGrav 15-year PTA [382]
- FOCOS (nuclear clock projection) [383]
- AEDGE (projection) [374]
- AION (projection) [374]
- DUAL (projection) [375]
- HELIOS (projection) [384]
- Optical microwave clock (projection) [385]
- Optical cavities [386]
- SrOH [387]
- Mechanical Resonators (projection) [378]
- IPTA (mock data) [388]

11 Vectors

B-L coupling

- Casimir [389, 390, 391]
- Eot-Wash (EP) [392]
- Eot-Wash (ISL) [393]
- MICROSCOPE [394]
- DM stability [395]
- Horizontal branch [396]
- Red giant [396]
- Sun [396]
- Eot-Wash (DM) [397]
- KAGRA (DM) [398]
- LIGO (O1) [399]
- LIGO/VIRGO [399]
- LISA Pathfinder [400, 401]
- PPTA [402]
- POLONAISE [403]
- Asteroids (projection) [404]
- HELIOS (projection) [384]
- LISA (projection) [404]
- MAGIS (projection) [376]
- Optomechanical membranes (projection) [405]
- SKA (projection) [406]
- Torsion balance (projection) [406]
- STE-QUEST (projection) [407]

12 Dark photons

Combined constraints [408]

SM photon-DP transitions

- Coulomb [409, 410, 411, 412, 413],
- Plimpton & Lawton's experiment [414, 413]
- Atomic spectroscopy [415]
- Atomic force microscopy (AFM) [413]
- Static magnetic field of the Earth [416, 417, 418]
- Static magnetic field of Jupiter [419, 418].
- Jupiter B-field/Juno mission [420]
- ALPs [78]
- ALPS-II (projection) [421]
- SPring-8 [422]
- UWA-LSW [423, 424]
- ADMX-LSW [425]
- CROWS [82].
- DarkSRF [426]
- DarkSRF (projection) [427]
- TEXONO [428]
- Crab nebula [429]
- COBE and FIRAS [430]
- STAX (projection) [431]

Production in stars

- CAST [432]
- SHIPS [433]
- HINODE [434]
- IAXO (modified for longitudinal mode) [435]
- New globular cluster bound [436]
- Old stellar bounds: Solar-L, HB and RG stars [396] (see also [437])
- Neutron stars [438]
- Solar neutrinos [439]
- XENON1T [440]

Dark matter cosmology/astro

- Blazars [441]
- Dark matter, Arias et al. [318]
- Dark matter, Witte et al. [442, 443]
- COBE/FIRAS, Caputo et al. [444, 430]
- COBE/FIRAS with Spectral distortions [445, 446]
- Lyman-alpha [447]
- ISM [448],
- Leo T dwarf [449]
- Gas clouds [449, 450]
- JWST [451]
- Parker Solar Probe [452]
- Planck + unWISE [453]
- INTEGRAL [454, 455]

Dark matter experiments

- Reinterpreted axion limits [408]
- APEX [456]
- ALPHA [59]
- AMAILS [457]
- BRASS-p [458]
- BREAD (projection) [62]
- Dandelion (projection) [459]
- DarkSide-50 [217]
- DAMIC [460]
- Dark E-field Radio [461, 462]
- DM Pathfinder [463]
- DOSUE-RR [464, 465]
- FAST Radio antenna [466]
- FUNK [467]
- GigaBREAD [468]
- MADMAX [469]
- LAMPOST [470]
- LOFAR (solar corona) [471]
- MuDHI [472]
- ORGAN [473, 36]
- ORPHEUS [474]
- QUALIPHIDE [475]
- Quantum cyclotron [476]
- SENSEI [477]
- SHUKET [478]
- SuperCDMS [479]
- SuperMAG [480, 481, 49]
- SQuAD [482],
- SQMS [483],
- SUPAX [484]
- SRF scanning [485]
- Tokyo dish antennae experiments [486, 487, 488]
- WISPDMX [489]
- XENON(100,1T,nT) [490, 343, 491, 492, 440, 493].

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