# 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-$\gamma$ (ALP decay) [116, 117, 118]
- SN1987A-$\gamma$ (low mass ALP conversion) [119, 117]
- SN1987A-$\gamma$,$\nu$ (high mass ALPs) [120]
- Low-energy supernovae (ALP decay) [82]
- Solar basin (NuSTAR) [121]
- Solar basin (NuSTAR and SPHINX) [122]
- Star clusters [123]
- SPT [124]
- Telescopes (Haystack) [125]
- Telescopes (MUSE) [126]
- Telescopes (VIMOS) [127]
- Telescopes (HST) [128, 129]
- Fermi galactic SN (projection) [130]
- THESEUS (projection) [131]
- eROSITA (projection) [132]
- White dwarf initial-final mass relation [133]
- XMM-Newton (decaying DM ALPs) [134]

### Cosmology

- Ionisation fraction, EBL, X-rays [135]
- BBN+$N_{\text{eff}}$ [136]
- Freeze in [137]

## 2 Heavy ALP-photon coupling

- ATALS (PbPb) [138]
- BaBar [139]
- Beam dump [140, 141, 139, 142, 143]
- Belle II [144]
- BESIII [145]
- CMS (PbPb) [146]
- LEP [147]
- LHC (pp)[148]
- NOMAD [149]
- OPAL [148]
- PrimEx [150, 151]
- CONUS (projection) [152]
- DUNE (projection) [153]
- FASER LLP (projection) [154]

## 3 Axion-electron

- EDELWEISS [155]
- Magnon non-demolition [156]
- DarkSide-50 [157]
- GERDA [158]
- LUX [159]
- Panda-X [160]
- SuperCDMS [161]
- XENON1T [162, 163]
- XENONnT [164]
- XENON1T (Solar basin) [165]
- Red giants ($\omega$Cen) [166]
- NV Centers (projection) [167]
- Solar neutrinos [168]
- Magnons (projection) [169]
- Polaritons (projection) [170]
- DARWIN (projection) [171]
- LZ (projection) [172]
- QUAX [173, 174]
- Semiconductors (projection) [175]
- White dwarf hint [176]
- Freeze-in irreducible axions [137]
- X-rays (1-loop decay) [177]

## 4 Axion-nucleon

Note: CASPEr and nEDM limits account for stochastic correction reported in [178]

- Casimir effect (fifth force) [179]
- CASPEr-ZULF-Comagnetometer [180]
- CASPEr-ZULF-Sidechain [181]
- nEDM (ultracold neutrons and mercury) [182]
- NASDUCK [183, 184]
- PSI HgM (nEDM) [185]
- K-3He comagnetometer (fifth force) [186]
- K-3He comagnetometer (dark matter) [187]
- JEDI [188]
- Old comagnetometers [189]
- Torsion balance [190]
- Neutron star cooling [191] (corrected from [192])
- SN1987A Cooling [193]
- SNO (deuterium dissasociation) [194]
- Proton storage ring (projection) [195]
- DM comagnetometer (projection) [189]
- CASPEr-gradient (projection) [181]
- Superfluid helium-3 HPD (projection) [196]

## 5 Axion-EDM

- Axinovae [197]
- Beam EDM [198]
- BBN (dark matter) [199]
- CASPEr-electric [200]
- nEDM [182]
- $HfF^+$ [201]
- JEDI [188]
- Rb/Quartz [202]
- SN1987A [203]
- *Planck*+BAO thermal axion bound [204]
- CASPEr-electric (projection) [205]
- Storage Ring EDM (projection) [205]

## 6 Axion mass versus $f_a$

- BBN (dark matter) [199]
- Beam EDM [198]
- Binary pulsars and Solar core constraint on $\bar{\theta}$ [206]. I include minor numerical corrections made by [207, 208].
- GW170817 [209]
- $HfF^+$ [201]
- Rb/Quartz [202]
- JEDI [188]
- nEDM [182]
- Piezoaxionic effect (projection) [210]
- *Planck*+BAO thermal axion bound [204]
- SN1987A [203]
- Neutron stars (projection) [206].
- NS-NS and NS-BH Inspirals (projection) [206].
- White dwarfs [211]

### 6.1 Black hole superradiance

- Baryakhtar et al. [212] (just Stellar mass BHs)
- Mehta et al. [212] (Stellar mass and SMBHs)
- Stott [213]
- Ünal et al. [214] (Quasars)
- Cardoso et al. [215] (dark photon)

## 7 Axion theory predictions

### 7.1 Post-inflation QCD axion

- Ballesteros et al. [216]
- Buschmann et al. 2020 [217]
- Buschmann et al. 2021 [218]
- Bonati et al. [219]
- Borsanyi et al. [220]
- Berkowitz et al. [221]
- Dine et al. [222]
- Petreczky et al. [223]
- Fleury & Moore [224]
- Klaer & Moore [225]
- Gorghetto et al. [226]
- Saikawa et al. [67]

### 7.2 Other dark matter predictions

- ALP Cogenesis [227]
- Early matter domination [228]
- Post-inflation ALP misalignment [229, 230]
- Trapped misalignment ($\mathcal{Z}_\mathcal{N}$ axion) [207]

## 8 CP-violating couplings

Combined constraints [231]

### Scalar-nucleon

- Red giants [232]
- MICROSCOPE [233].
- Eot-Wash [234, 235, 236]
- Irvine [237]. Corrected to $2\sigma$ limit by [238]
- HUST [239, 240, 241, 242].
- Stanford [243]
- IUPUI [244].
- Wuhan [238]

### Pseudoscalar-electron

- Red giants [232]
- Eot-wash [245]
- NIST [246]
- SMILE [247].
- QUAX [248, 249, 250]
- Washington [251, 252].
- XENON1T [253]
- Magnon (projection) [170]
- QUAX (projection) [248].

### Pseudoscalar-nucleon

- Neutron star cooling [191]
- Hefei (Earth) [254]
- Hefei (mm) [255]
- Washington [256]. Limit taken from [257].
- SMILE [247].
- Mainz [258]
- Moon/Sun [259]
- ARIADNE (projection) [260]
- CASPEr-wind (projection) [205]
- DM comagnetometer (projection) [189]
- Fifth force Ne-Rb-K comagnetometer (projection) [261]

## 9 Scalars

### Scalar-photon

- Globular clusters [91]
- Eot-Wash (EP) [262]
- Fifth force [263, 264, 265, 266]
- MICROSCOPE [233]
- AURIGA [267]
- BACON [268]
- Cs/Cav [269]
- DAMNED [270]
- Dy/Dy [271]
- Dy/Quartz [202]
- Dynamic Decoupling [272]
- GEO600 [273]
- LIGO O3 [274]
- Holometer [275]
- H/Quartz/Sapphire [276]
- PTB (Yb+, Sr clock) [277]
- $I_2$ [278]
- Rb/Cs [279]
- Sr/Si [280]
- Yb/Sr [281]
- AEDGE (projection) [282]
- AION (projection) [282]
- DUAL (projection) [283]
- MAGIS (projection) [284]
- Nuclear clock (projection) [285]
- Mechanical Resonators (projection) [286]

### Scalar-electron

- Red giants [232]
- White dwarfs [287]
- Eot-Wash (EP) [262]
- Fifth force [263, 264, 265, 266]
- MICROSCOPE [233]
- AURIGA [267]
- Cs/Cav [269]
- DAMNED [270]
- GEO600 [273]
- Holometer [275]
- H/Quartz/Sapphire [276]
- $I_2$ [278]
- H/Si [280]
- Rb/Quartz [202]
- Yb/Cs [288]
- LIGO O3 [274]
- FOCOS (nuclear clock projection) [289]
- AEDGE (projection) [282]
- AION (projection) [282]
- DUAL (projection) [283]
- Optical microwave clock (projection) [290]
- Optical cavities [291]
- SrOH [292]
- Mechanical Resonators (projection) [286]
- IPTA (mock data) [293]

## 10 Vectors

### B-L coupling

- Casimir [294, 295, 296]
- Eot-Wash (EP) [297]
- Eot-Wash (ISL) [298]
- MICROSCOPE [299]
- DM stability [300]
- Horizontal branch [232]
- Sun [232]
- Eot-Wash (DM) [301]
- LIGO (O1) [302]
- LIGO/VIRGO [302]
- Asteroids (projection) [303]
- LISA (projection) [303]
- MAGIS (projection) [284]
- Optomechanical membranes (projection) [304]
- SKA (projection) [305]
- Torsion balance (projection) [305]
- STE-QUEST (projection) [306]

## 11 Dark photons

Combined constraints [307]

### SM photon-DP transitions

- Coulomb [308, 309, 310, 311, 312],
- Plimpton & Lawton's experiment [313, 312]
- Atomic spectroscopy [314]
- Atomic force microscopy (AFM) [312]
- Static magnetic field of the Earth [315, 316, 317]
- Static magnetic field of Jupiter [318, 317].
- ALPs [58]
- ALPS-II (projection) [319]
- SPring-8 [320]
- UWA-LSW [321, 322]
- ADMX-LSW [323]
- CROWS [61].
- DarkSRF [324]
- DarkSRF (projection) [325]
- TEXONO [326]
- Crab nebula [327]
- COBE and FIRAS [328]
- STAX (projection) [329]

### Production in stars

- CAST [330]
- SHIPS [331]
- HINODE [332]
- HB and RG stars [333]
- Neutron stars [334]
- Solar neutrinos [335]
- XENON1T [336]

### Dark matter cosmology/astro

- Arias et al. [229]
- Witte et al. [337, 338]
- Caputo et al. [339, 328],
- IGM [340],
- Leo T dwarf [341]
- Gas clouds [342]

### Dark matter experiments

- Reinterpreted axion limits [307]
- ALPHA [41]
- BREAD (projection) [43]
- DarkSide-50 [157]
- DAMIC [343]
- Dark E-field Radio [344]
- DM Pathfinder [345]
- DOSUE-RR [346]
- FAST Radio antenna [347]
- FUNK [348]
- LAMPOST [349]
- LOFAR (solar corona) [350]
- MuDHI [351]
- ORGAN [352]
- ORPHEUS [353]
- QUALIPHIDE [354]
- Quantum cyclotron [355]
- SENSEI [356]
- SHUKET [357]
- SuperCDMS [358]
- SuperMAG [359, 360]
- SQuAD [361],
- SQMS [362],
- Tokyo dish antennae experiments [363, 364, 365]
- WISPDMX [366]
- XENON(100,1T,nT) [175, 253, 367, 368, 336, 369].

## References


[1] J. L. Ouellet et al., *First Results from ABRACADABRA-10 cm: A Search for Sub-μeV Axion Dark Matter*, Phys. Rev. Lett. **122** (2019) 121802 [1810.12257].

[2] C. P. Salemi et al., *Search for Low-Mass Axion Dark Matter with ABRACADABRA-10 cm*, Phys. Rev. Lett. **127** (2021) 081801 [2102.06722].

[3] S. J. Asztalos, G. Carosi, C. Hagmann, D. Kinion, K. van Bibber, M. Hotz, L. J. Rosenberg, G. Rybka, J. Hoskins, J. Hwang, P. Sikivie, D. B. Tanner, R. Bradley, J. Clarke and ADMX Collaboration, *SQUID-Based Microwave Cavity Search for Dark-Matter Axions*, Phys. Rev. Lett. **104** (2010) 041301 [0910.5914].

[4] ADMX Collaboration, N. Du et al., *A Search for Invisible Axion Dark Matter with the Axion Dark Matter Experiment*, Phys. Rev. Lett. **120** (2018) 151301 [1804.05750].

[5] ADMX Collaboration, T. Braine et al., *Extended Search for the Invisible Axion with the Axion Dark Matter Experiment*, Phys. Rev. Lett. **124** (2020) 101303 [1910.08638].

[6] ADMX Collaboration, C. Bartram et al., *Search for Invisible Axion Dark Matter in the 3.3–4.2 μeV Mass Range*, Phys. Rev. Lett. **127** (2021) 261803 [2110.06096].

[7] ADMX Collaboration, C. Boutan et al., *Piezoelectrically Tuned Multimode Cavity Search for Axion Dark Matter*, Phys. Rev. Lett. **121** (2018) 261302 [1901.00920].

[8] C. Bartram et al., *Dark Matter Axion Search Using a Josephson Traveling Wave Parametric Amplifier*, 2110.10262.

[9] N. Crisosto, P. Sikivie, N. S. Sullivan, D. B. Tanner, J. Yang and G. Rybka, *ADMX SLIC: Results from a Superconducting LC Circuit Investigating Cold Axions*, Phys. Rev. Lett. **124** (2020) 241101 [1911.05772].

[10] S. Lee, S. Ahn, J. Choi, B. R. Ko and Y. K. Semertzidis, *Axion Dark Matter Search around 6.7 μeV*, Phys. Rev. Lett. **124** (2020) 101802 [2001.05102].

[11] J. Jeong, S. Youn, S. Bae, J. Kim, T. Seong, J. E. Kim and Y. K. Semertzidis, *Search for Invisible Axion Dark Matter with a Multiple-Cell Haloscope*, Phys. Rev. Lett. **125** (2020) 221302 [2008.10141].

[12] CAPP Collaboration, O. Kwon et al., *First Results from an Axion Haloscope at CAPP around 10.7 μeV*, Phys. Rev. Lett. **126** (2021) 191802 [2012.10764].

[13] Y. Lee, B. Yang, H. Yoon, M. Ahn, H. Park, B. Min, D. Kim and J. Yoo, *Searching for Invisible Axion Dark Matter with an 18 T Magnet Haloscope*, Phys. Rev. Lett. **128** (2022) 241805 [2206.08845].

[14] J. Kim et al., *Near-Quantum-Noise Axion Dark Matter Search at CAPP around 9.5 μeV*, 2207.13597.

[15] A. K. Yi et al., *DFSZ Axion Dark Matter Search around 4.55 μeV*, 2210.10961.

[16] C. M. Adair et al., *Search for Dark Matter Axions with CAST-CAPP*, Nature Commun. **13** (2022) 6180 [2211.02902].

[17] Y. Oshima, H. Fujimoto, M. Ando, T. Fujita, J. Kume, Y. Michimura, S. Morisaki, K. Nagano, A. Nishizawa and I. Obata, *First Results of Axion Dark Matter Search with DANCE*, 2303.03594.

[18] J. A. Devlin et al., *Constraints on the Coupling between Axionlike Dark Matter and Photons Using an Antiproton Superconducting Tuned Detection Circuit in a Cryogenic Penning Trap*, Phys. Rev. Lett. **126** (2021) 041301 [2101.11290].

[19] T. Grenet, R. Ballou, Q. Basto, K. Martineau, P. Perrier, P. Pugnat, J. Quevillon, N. Roch and C. Smith, *The Grenoble Axion Haloscope platform (GrAHal): development plan and first results*, 2110.14406.

[20] HAYSTAC Collaboration, L. Zhong et al., *Results from phase 1 of the HAYSTAC microwave cavity axion experiment*, Phys. Rev. D **97** (2018) 092001 [1803.03690].

[21] HAYSTAC Collaboration, K. M. Backes et al., *A quantum-enhanced search for dark matter axions*, Nature **590** (2021) 238 [2008.01853].

[22] HAYSTAC Collaboration, M. J. Jewell et al., *New Results from HAYSTAC's Phase II Operation with a Squeezed State Receiver*, 2301.09721.

[23] B. T. McAllister, G. Flower, E. N. Ivanov, M. Goryachev, J. Bourhill and M. E. Tobar, *The ORGAN Experiment: An axion haloscope above 15 GHz*, Phys. Dark Univ. **18** (2017) 67 [1706.00209].

[24] A. P. Quiskamp, B. T. McAllister, P. Altin, E. N. Ivanov, M. Goryachev and M. E. Tobar, *Direct search for dark matter axions excluding ALP cogenesis in the 63- to 67-μeV range with the ORGAN experiment*, Sci. Adv. **8** (2022) abq3765 [2203.12152].

[25] D. Alesini et al., *Galactic axions search with a superconducting resonant cavity*, Phys. Rev. D **99** (2019) 101101 [1903.06547].

[26] D. Alesini et al., *Search for invisible axion dark matter of mass $m_a = 43$ μeV with the QUAX–aγ experiment*, Phys. Rev. D **103** (2021) 102004 [2012.09498].

[27] D. Alesini et al., *Search for Galactic axions with a high-Q dielectric cavity*, Phys. Rev. D **106** (2022) 052007 [2208.12670].

[28] CAST Collaboration, A. A. Melcón et al., *First results of the CAST-RADES haloscope search for axions at 34.67 μeV*, JHEP **21** (2020) 075 [2104.13798].

[29] S. DePanfilis, A. C. Melissinos, B. E. Moskowitz, J. T. Rogers, Y. K. Semertzidis, W. U. Wuensch, H. J. Halama, A. G. Prodell, W. B. Fowler and F. A. Nezrick, *Limits on the abundance and coupling of cosmic axions at 4.5$< m_a <$5.0 μev*, Phys. Rev. Lett. **59** (1987) 839.

[30] A. V. Gramolin, D. Aybas, D. Johnson, J. Adam and A. O. Sushkov, *Search for axion-like dark matter with ferromagnets*, Nature Phys. **17** (2021) 79 [2003.03348].

[31] TASEH Collaboration, H. Chang et al., *First Results from the Taiwan Axion Search Experiment with a Haloscope at 19.6 μeV*, Phys. Rev. Lett. **129** (2022) 111802 [2205.05574].

[32] A. Arza, M. A. Fedderke, P. W. Graham, D. F. J. Kimball and S. Kalia, *Earth as a transducer for axion dark-matter detection*, Phys. Rev. D **105** (2022) 095007 [2112.09620].

[33] C. Hagmann, P. Sikivie, N. S. Sullivan and D. B. Tanner, *Results from a search for cosmic axions*, Phys. Rev. D **42** (1990) 1297.

[34] C. A. Thomson, B. T. McAllister, M. Goryachev, E. N. Ivanov and M. E. Tobar, *Upconversion Loop Oscillator Axion Detection Experiment: A Precision Frequency Interferometric Axion Dark Matter Search with a Cylindrical Microwave Cavity*, *Phys. Rev. Lett.* **126** (2021) 081803 [1912.07751]. [Erratum: Phys.Rev.Lett. 127, 019901 (2021)].

[35] C. A. Thomson, M. Goryachev, B. T. McAllister, E. N. Ivanov, P. Altin and M. E. Tobar, *Searching for Low-Mass Axions using Resonant Upconversion*, 2301.06778.

[36] *ABRACADABRA*, https://abracadabra.mit.edu/.

[37] H. Liu, B. D. Elwood, M. Evans and J. Thaler, *Searching for Axion Dark Matter with Birefringent Cavities*, *Phys. Rev. D* **100** (2019) 023548 [1809.01656].

[38] I. Stern, *ADMX Status*, *PoS* **ICHEP2016** (2016) 198 [1612.08296].

[39] K. Nagano, T. Fujita, Y. Michimura and I. Obata, *Axion Dark Matter Search with Interferometric Gravitational Wave Detectors*, *Phys. Rev. Lett.* **123** (2019) 111301 [1903.02017].

[40] M. Lawson, A. J. Millar, M. Pancaldi, E. Vitagliano and F. Wilczek, *Tunable axion plasma haloscopes*, *Phys. Rev. Lett.* **123** (2019) 141802 [1904.11872].

[41] A. J. Millar et al., *ALPHA: Searching For Dark Matter with Plasma Haloscopes*, 2210.00017.

[42] *BRASS*, https://www1.physik.uni-hamburg.de/iexp/gruppe-horns/forschung/brass.html.

[43] BREAD Collaboration, J. Liu et al., *Broadband Solenoidal Haloscope for Terahertz Axion Detection*, *Phys. Rev. Lett.* **128** (2022) 131801 [2111.12103].

[44] B. Aja et al., *The Canfranc Axion Detection Experiment (CADEx): search for axions at 90 GHz with Kinetic Inductance Detectors*, *JCAP* **11** (2022) 044 [2206.02980].

[45] J. De Miguel and J. F. Hernández-Cabrera, *Discovery prospects with the Dark-photons & Axion-Like particles Interferometer, part I*, 2303.03997.

[46] *DMRadio*, https://indico.mit.edu/event/151/contributions/295/attachments/96/172/Dark%20Matter%20Radio_CambridgeAxions2021.pdf.

[47] DMRadio Collaboration, L. Brouwer et al., *Projected sensitivity of DMRadio-m3: A search for the QCD axion below 1 μeV*, *Phys. Rev. D* **106** (2022) 103008 [2204.13781].

[48] Y. Michimura, Y. Oshima, T. Watanabe, T. Kawasaki, H. Takeda, M. Ando, K. Nagano, I. Obata and T. Fujita, *DANCE: Dark matter Axion search with riNg Cavity Experiment*, *J. Phys. Conf. Ser.* **1468** (2020) 012032 [1911.05196].

[49] M. Baryakhtar, J. Huang and R. Lasenby, *Axion and hidden photon dark matter detection with multilayer optical haloscopes*, *Phys. Rev. D* **98** (2018) 035006 [1803.11455].

[50] S. Beurthey et al., *MADMAX Status Report*, 2003.10894.

[51] D. Alesini, D. Babusci, D. Di Gioacchino, C. Gatti, G. Lamanna and C. Ligi, *The KLASH Proposal*, 1707.06010.

[52] C. Gatti, *From KLASH to FLASH: A Proposal for a 100-300 MHz Haloscope*, https://indico.cern.ch/event/1115163/contributions/4685952/attachments/2393240/4091553/FLASH-100MHZHaloscopeWorkshop.pdf.

[53] A. Rettaroli, *Probing the axion-photon interaction with QUAX experiment: status and perspectives*, https://agenda.infn.it/event/20431/contributions/137687/attachments/82511/108428/Rettaroli_Patras2021_compressed.pdf.

[54] J. Schütte-Engel, D. J. E. Marsh, A. J. Millar, A. Sekine, F. Chadha-Day, S. Hoof, M. N. Ali, K.-C. Fong, E. Hardy and L. Šmejkal, *Axion quasiparticles for axion dark matter detection*, *JCAP* **08** (2021) 066 [2102.05366].

[55] J. F. Bourhill, E. C. I. Paterson, M. Goryachev and M. E. Tobar, *Twisted Anyon Cavity Resonators with Bulk Modes of Chiral Symmetry and Sensitivity to Ultra-Light Axion Dark Matter*, 2208.01640.

[56] Z. Zhang, D. Horns and O. Ghosh, *Search for dark matter with an LC circuit*, *Phys. Rev. D* **106** (2022) 023003 [2111.04541].

[57] A. Berlin, R. T. D'Agnolo, S. A. R. Ellis and K. Zhou, *Heterodyne broadband detection of axion dark matter*, *Phys. Rev. D* **104** (2021) L111701 [2007.15656].

[58] K. Ehret et al., *New ALPS Results on Hidden-Sector Lightweights*, *Phys. Lett. B* **689** (2010) 149 [1004.1313].

[59] CAST Collaboration, S. Andriamonje et al., *An Improved limit on the axion-photon coupling from the CAST experiment*, *JCAP* **04** (2007) 010 [hep-ex/0702006].

[60] CAST Collaboration, V. Anastassopoulos et al., *New CAST Limit on the Axion-Photon Interaction*, *Nature Phys.* **13** (2017) 584 [1705.02290].

[61] M. Betz, F. Caspers, M. Gasior, M. Thumm and S. W. Rieger, *First results of the CERN Resonant Weakly Interacting sub-eV Particle Search (CROWS)*, *Phys. Rev. D* **88** (2013) 075014 [1310.8098].

[62] OSQAR Collaboration, R. Ballou et al., *New exclusion limits on scalar and pseudoscalar axionlike particles from light shining through a wall*, *Phys. Rev. D* **92** (2015) 092002 [1506.08082].

[63] F. Della Valle, A. Ejlli, U. Gastaldi, G. Messineo, E. Milotti, R. Pengo, G. Ruoso and G. Zavattini, *The PVLAS experiment: measuring vacuum magnetic birefringence and dichroism with a birefringent Fabry–Perot cavity*, *Eur. Phys. J. C* **76** (2016) 24 [1510.08052].

[64] SAPPHIRES Collaboration, K. Homma et al., *Search for sub-eV axion-like resonance states via stimulated quasi-parallel laser collisions with the parameterization including fully asymmetric collisional geometry*, *JHEP* **12** (2021) 108 [2105.01224].

[65] SAPPHIRES Collaboration, Y. Kirita et al., *Search for sub-eV axion-like particles in a stimulated resonant photon-photon collider with two laser beams based on a novel method to discriminate pressure-independent components*, *JHEP* **10** (2022) 176 [2208.09880].

[66] M. D. Ortiz et al., *Design of the ALPS II optical system*, *Phys. Dark Univ.* **35** (2022) 100968 [2009.14294].

[67] IAXO Collaboration, E. Armengaud et al., *Physics potential of the International Axion Observatory (IAXO)*, *JCAP* **06** (2019) 047 [1904.09155].

[68] S.-F. Ge, K. Hamaguchi, K. Ichimura, K. Ishidoshiro, Y. Kanazawa, Y. Kishimoto, N. Nagata and J. Zheng, *Supernova-scope for the Direct Search of Supernova Axions*, *JCAP* **11** (2020) 059 [2008.03924].

[69] M. Escudero, C. K. Pooni, M. Fairbairn, D. Blas, X. Du and D. J. E. Marsh, *Axion Star Explosions: A New Source for Axion Indirect Detection*, 2302.10206.

[70] M. Xiao, K. M. Perez, M. Giannotti, O. Straniero, A. Mirizzi, B. W. Grefenstette, B. M. Roach and M. Nynka, *Constraints on Axionlike Particles from a Hard X-Ray Observation of Betelgeuse*, *Phys. Rev. Lett.* **126** (2021) 031101 [2009.09059].

[71] BICEP/Keck Collaboration, P. A. R. Ade et al., *BICEP/Keck XIV: Improved constraints on axionlike polarization oscillations in the cosmic microwave background*, *Phys. Rev. D* **105** (2022) 022006 [2108.03316].

[72] A. Keller, S. O'Brien, A. Kamdar, N. M. Rapidis, A. F. Leder and K. van Bibber, *A Model-independent Radio Telescope Dark Matter Search*, *Astrophys. J.* **927** (2022) 71 [2112.03439].

[73] M. H. Chan, *Constraining the axion-photon coupling using radio data of the Bullet Cluster*, *Sci. Rep.* **11** (2021) 20087 [2109.11734].

[74] K. Kohri and H. Kodama, *Axion-Like Particles and Recent Observations of the Cosmic Infrared Background Radiation*, *Phys. Rev. D* **96** (2017) 051701 [1704.05189].

[75] D. Wouters and P. Brun, *Constraints on Axion-like Particles from X-Ray Observations of the Hydra Galaxy Cluster*, *Astrophys. J.* **772** (2013) 44 [1304.0989].

[76] M. C. D. Marsh, H. R. Russell, A. C. Fabian, B. P. McNamara, P. Nulsen and C. S. Reynolds, *A New Bound on Axion-Like Particles*, *JCAP* **12** (2017) 036 [1703.07354].

[77] C. S. Reynolds, M. C. D. Marsh, H. R. Russell, A. C. Fabian, R. Smith, F. Tombesi and S. Veilleux, *Astrophysical Limits on Very Light Axion-like Particles from Chandra Grating Spectroscopy of NGC 1275*, *Astrophys. J.* **890** (2020) 59 [1907.05475].

[78] J. S. Reynés, J. H. Matthews, C. S. Reynolds, H. R. Russell, R. N. Smith and M. C. D. Marsh, *New constraints on light axion-like particles using Chandra transmission grating spectroscopy of the powerful cluster-hosted quasar H1821+643*, *Mon. Not. Roy. Astron. Soc.* **510** (2021) 1264 [2109.03261].

[79] F. Capozzi, R. Z. Ferreira, L. Lopez-Honorez and O. Mena, *CMB and Lyman-$\alpha$ constraints on dark matter decays to photons*, 2303.07426.

[80] H. Liu, W. Qin, G. W. Ridgway and T. R. Slatyer, *Exotic energy injection in the early universe II: CMB spectral distortions and constraints on light dark matter*, 2303.07370.

[81] B. Bolliet, J. Chluba and R. Battye, *Spectral distortion constraints on photon injection from low-mass decaying particles*, *Mon. Not. Roy. Astron. Soc.* **507** (2021) 3148 [2012.07292].

[82] A. Caputo, H.-T. Janka, G. Raffelt and E. Vitagliano, *Low-Energy Supernovae Severely Constrain Radiative Particle Decays*, *Phys. Rev. Lett.* **128** (2022) 221103 [2201.09890].

[83] F. Calore, P. Carenza, C. Eckner, T. Fischer, M. Giannotti, J. Jaeckel, K. Kotake, T. Kuroda, A. Mirizzi and F. Sivo, *3D template-based Fermi-LAT constraints on the diffuse supernova axion-like particle background*, *Phys. Rev. D* **105** (2022) 063028 [2110.03679].

[84] F. Calore, P. Carenza, M. Giannotti, J. Jaeckel and A. Mirizzi, *Bounds on axionlike particles from the diffuse supernova flux*, *Phys. Rev. D* **102** (2020) 123005 [2008.11741].

[85] M. A. Buen-Abad, J. Fan and C. Sun, *Constraints on Axions from Cosmic Distance Measurements*, 2011.05993.

[86] Fermi-LAT Collaboration, M. Ajello et al., *Search for Spectral Irregularities due to Photon–Axionlike-Particle Oscillations with the Fermi Large Area Telescope*, *Phys. Rev. Lett.* **116** (2016) 161101 [1603.06978].

[87] M. Meyer and T. Petrushevska, *Search for Axionlike-Particle-Induced Prompt $\gamma$-Ray Emission from Extragalactic Core-Collapse Supernovae with the Fermi Large Area Telescope*, *Phys. Rev. Lett.* **124** (2020) 231101 [2006.06722]. [Erratum: Phys.Rev.Lett. 125, 119901 (2020)].

[88] J. Davies, M. Meyer and G. Cotter, *Constraints on axionlike particles from a combined analysis of three flaring Fermi flat-spectrum radio quasars*, 2211.03414.

[89] J. L. Bernal, A. Caputo, G. Sato-Polito, J. Mirocha and M. Kamionkowski, *Seeking dark matter with $\gamma$-ray attenuation*, 2208.13794.

[90] A. Ayala, I. Domínguez, M. Giannotti, A. Mirizzi and O. Straniero, *Revisiting the bound on axion-photon coupling from Globular Clusters*, *Phys. Rev. Lett.* **113** (2014) 191302 [1406.6053].

[91] M. J. Dolan, F. J. Hiskens and R. R. Volkas, *Advancing globular cluster constraints on the axion-photon coupling*, *JCAP* **10** (2022) 096 [2207.03102].

[92] S. Jacobsen, T. Linden and K. Freese, *Constraining Axion-Like Particles with HAWC Observations of TeV Blazars*, 2203.04332.

[93] H.E.S.S. Collaboration, A. Abramowski et al., *Constraints on axionlike particles with H.E.S.S. from the irregularity of the PKS 2155-304 energy spectrum*, *Phys. Rev. D* **88** (2013) 102003 [1311.3148].

[94] F. Calore, A. Dekker, P. D. Serpico and T. Siegert, *Constraints on light decaying dark matter candidates from 16 years of INTEGRAL/SPI observations*, 2209.06299.

[95] D. Wadekar and Z. Wang, *Strong constraints on decay and annihilation of dark matter from heating of gas-rich dwarf galaxies*, *Phys. Rev. D* **106** (2022) 075007 [2111.08025].

[96] C. Dessert, A. J. Long and B. R. Safdi, *No Evidence for Axions from Chandra Observation of the Magnetic White Dwarf RE J0317-853*, *Phys. Rev. Lett.* **128** (2022) 071102 [2104.12772].

[97] C. Dessert, D. Dunsky and B. R. Safdi, *Upper limit on the axion-photon coupling from magnetic white dwarf polarization*, *Phys. Rev. D* **105** (2022) 103034 [2203.04319].

[98] M. M. Ivanov, Y. Y. Kovalev, M. L. Lister, A. G. Panin, A. B. Pushkarev, T. Savolainen and S. V. Troitsky, *Constraining the photon coupling of ultra-light dark-matter axion-like particles by polarization variations of parsec-scale jets in active galaxies*, *JCAP* **02** (2019) 059 [1811.10997].

[99] H.-J. Li, J.-G. Guo, X.-J. Bi, S.-J. Lin and P.-F. Yin, *Limits on axionlike particles from Mrk 421 with 4.5-year period observations by ARGO-YBJ and Fermi-LAT*, *Phys. Rev. D* **103** (2021) 083003 [2008.09464].

[100] H.-J. Li, X.-J. Bi and P.-F. Yin, *Searching for axion-like particles with the blazar observations of MAGIC and Fermi-LAT **, Chin. Phys. C **46** (2022) 085105 [2110.13636].

[101] J. W. Foster, Y. Kahn, O. Macias, Z. Sun, R. P. Eatough, V. I. Kondratiev, W. M. Peters, C. Weniger and B. R. Safdi, *Green Bank and Effelsberg Radio Telescope Searches for Axion Dark Matter Conversion in Neutron Star Magnetospheres*, Phys. Rev. Lett. **125** (2020) 171301 [2004.00011].

[102] J. Darling, *New Limits on Axionic Dark Matter from the Magnetar PSR J1745-2900*, Astrophys. J. Lett. **900** (2020) L28 [2008.11188].

[103] R. A. Battye, J. Darling, J. I. McDonald and S. Srinivasan, *Towards robust constraints on axion dark matter using PSR J1745-2900*, Phys. Rev. D **105** (2022) L021305 [2107.01225].

[104] J. W. Foster, S. J. Witte, M. Lawson, T. Linden, V. Gajjar, C. Weniger and B. R. Safdi, *Extraterrestrial Axion Search with the Breakthrough Listen Galactic Center Survey*, Phys. Rev. Lett. **129** (2022) 251102 [2202.08274].

[105] R. A. Battye, M. J. Keith, J. I. McDonald, S. Srinivasan, B. W. Stappers and P. Weltevrede, *Searching for Time-Dependent Axion Dark Matter Signals in Pulsars*, 2303.11792.

[106] K. Perez, K. C. Y. Ng, J. F. Beacom, C. Hersh, S. Horiuchi and R. Krivonos, *Almost closing the νMSM sterile neutrino dark matter window with NuSTAR*, Phys. Rev. D **95** (2017) 123002 [1609.00667].

[107] K. C. Y. Ng, B. M. Roach, K. Perez, J. F. Beacom, S. Horiuchi, R. Krivonos and D. R. Wik, *New Constraints on Sterile Neutrino Dark Matter from NuSTAR M31 Observations*, Phys. Rev. D **99** (2019) 083005 [1901.01262].

[108] B. M. Roach, S. Rossland, K. C. Y. Ng, K. Perez, J. F. Beacom, B. W. Grefenstette, S. Horiuchi, R. Krivonos and D. R. Wik, *Long-exposure NuSTAR constraints on decaying dark matter in the Galactic halo*, Phys. Rev. D **107** (2023) 023009 [2207.04572].

[109] M. A. Fedderke, P. W. Graham and S. Rajendran, *Axion Dark Matter Detection with CMB Polarization*, Phys. Rev. D **100** (2019) 015040 [1903.02666].

[110] POLARBEAR Collaboration, S. Adachi et al., *Constraints on axion-like polarization oscillations in the cosmic microwave background with POLARBEAR*, 2303.08410.

[111] A. Castillo, J. Martin-Camalich, J. Terol-Calvo, D. Blas, A. Caputo, R. T. G. Santos, L. Sberna, M. Peel and J. A. Rubiño Martín, *Searching for dark-matter waves with PPTA and QUIJOTE pulsar polarimetry*, JCAP **06** (2022) 014 [2201.03422].

[112] T. Liu, X. Lou and J. Ren, *Pulsar Polarization Arrays*, 2111.10615.

[113] D. Noordhuis, A. Prabhu, S. J. Witte, A. Y. Chen, F. Cruz and C. Weniger, *Novel Constraints on Axions Produced in Pulsar Polar Cap Cascades*, 2209.09917.

[114] C. Severino and I. Lopes, *Asteroseismology: Looking for axions in the red supergiant star Alpha Ori*, 2212.01890.

[115] N. Vinyoles, A. Serenelli, F. L. Villante, S. Basu, J. Redondo and J. Isern, *New axion and hidden photon constraints from a solar data global fit*, JCAP **2015** (2015) 015 [1501.01639].

[116] J. Jaeckel, P. C. Malta and J. Redondo, *Decay photons from the axionlike particles burst of type II supernovae*, Phys. Rev. D **98** (2018) 055032 [1702.02964].

[117] S. Hoof and L. Schulz, *Updated constraints on axion-like particles from temporal information in supernova SN1987A gamma-ray data*, 2212.09764.

[118] E. Müller, F. Calore, P. Carenza, C. Eckner and M. C. D. Marsh, *Investigating the gamma-ray burst from decaying MeV-scale axion-like particles produced in supernova explosions*, 2304.01060.

[119] A. Payez, C. Evoli, T. Fischer, M. Giannotti, A. Mirizzi and A. Ringwald, *Revisiting the SN1987A gamma-ray limit on ultralight axion-like particles*, JCAP **02** (2015) 006 [1410.3747].

[120] A. Caputo, G. Raffelt and E. Vitagliano, *Muonic boson limits: Supernova redux*, Phys. Rev. D **105** (2022) 035022 [2109.03244].

[121] W. DeRocco, S. Wegsman, B. Grefenstette, J. Huang and K. Van Tilburg, *First Indirect Detection Constraints on Axions in the Solar Basin*, Phys. Rev. Lett. **129** (2022) 101101 [2205.05700].

[122] C. Beaufort, M. Bastero-Gil, T. Luce and D. Santos, *New solar X-ray constraints on keV Axion-Like Particles*, 2303.06968.

[123] C. Dessert, J. W. Foster and B. R. Safdi, *X-ray Searches for Axions from Super Star Clusters*, Phys. Rev. Lett. **125** (2020) 261102 [2008.03305].

[124] SPT-3G Collaboration, K. R. Ferguson et al., *Searching for axionlike time-dependent cosmic birefringence with data from SPT-3G*, Phys. Rev. D **106** (2022) 042011 [2203.16567].

[125] B. D. Blout, E. J. Daw, M. P. Decowski, P. T. P. Ho, L. J. Rosenberg and D. B. Yu, *A Radio telescope search for axions*, Astrophys. J. **546** (2001) 825 [astro-ph/0006310].

[126] M. Regis, M. Taoso, D. Vaz, J. Brinchmann, S. L. Zoutendijk, N. F. Bouché and M. Steinmetz, *Searching for light in the darkness: Bounds on ALP dark matter with the optical MUSE-faint survey*, Phys. Lett. B **814** (2021) 136075 [2009.01310].

[127] D. Grin, G. Covone, J.-P. Kneib, M. Kamionkowski, A. Blain and E. Jullo, *A Telescope Search for Decaying Relic Axions*, Phys. Rev. D **75** (2007) 105018 [astro-ph/0611502].

[128] K. Nakayama and W. Yin, *Anisotropic cosmic optical background bound for decaying dark matter in light of the LORRI anomaly*, Phys. Rev. D **106** (2022) 103505 [2205.01079].

[129] P. Carenza, G. Lucente and E. Vitagliano, *Probing the Blue Axion with Cosmic Optical Background Anisotropies*, 2301.06560.

[130] M. Meyer, M. Giannotti, A. Mirizzi, J. Conrad and M. A. Sánchez-Conde, *Fermi Large Area Telescope as a Galactic Supernovae Axionscope*, Phys. Rev. Lett. **118** (2017) 011103 [1609.02350].

[131] C. Thorpe-Morgan, D. Malyshev, A. Santangelo, J. Jochum, B. Jäger, M. Sasaki and S. Saeedi, *THESEUS insights into axionlike particles, dark photon, and sterile neutrino dark matter*, Phys. Rev. D **102** (2020) 123003 [2008.08306].

[132] A. Dekker, E. Peerbooms, F. Zimmer, K. C. Y. Ng and S. Ando, *Searches for sterile neutrinos and axionlike particles from the Galactic halo with eROSITA*, Phys. Rev. D **104** (2021) 023021 [2103.13241].

[133] M. J. Dolan, F. J. Hiskens and R. R. Volkas, *Constraining axion-like particles using the white dwarf initial-final mass relation*, JCAP **09** (2021) 010 [2102.00379].

[134] J. W. Foster, M. Kongsore, C. Dessert, Y. Park, N. L. Rodd, K. Cranmer and B. R. Safdi, *Deep Search for Decaying Dark Matter with XMM-Newton Blank-Sky Observations*, Phys. Rev. Lett. **127** (2021) 051101 [2102.02207].

[135] D. Cadamuro and J. Redondo, *Cosmological bounds on pseudo Nambu-Goldstone bosons*, JCAP **02** (2012) 032 [1110.2895].

[136] P. F. Depta, M. Hufnagel and K. Schmidt-Hoberg, *Robust cosmological constraints on axion-like particles*, JCAP **05** (2020) 009 [2002.08370].

[137] K. Langhoff, N. J. Outmezguine and N. L. Rodd, *Irreducible Axion Background*, Phys. Rev. Lett. **129** (2022) 241101 [2209.06216].

[138] ATLAS Collaboration, G. Aad et al., *Measurement of light-by-light scattering and search for axion-like particles with 2.2 nb$^{-1}$ of Pb+Pb data with the ATLAS detector*, JHEP **03** (2021) 243 [2008.05355]. [Erratum: JHEP 11, 050 (2021)].

[139] M. J. Dolan, T. Ferber, C. Hearty, F. Kahlhoefer and K. Schmidt-Hoberg, *Revised constraints and Belle II sensitivity for visible and invisible axion-like particles*, JHEP **12** (2017) 094 [1709.00009]. [Erratum: JHEP 03, 190 (2021)].

[140] CHARM Collaboration, F. Bergsma et al., *Search for Axion Like Particle Production in 400-GeV Proton - Copper Interactions*, Phys. Lett. B **157** (1985) 458.

[141] E. M. Riordan et al., *A Search for Short Lived Axions in an Electron Beam Dump Experiment*, Phys. Rev. Lett. **59** (1987) 755.

[142] J. Blumlein et al., *Limits on neutral light scalar and pseudoscalar particles in a proton beam dump experiment*, Z. Phys. C **51** (1991) 341.

[143] NA64 Collaboration, D. Banerjee et al., *Search for Axionlike and Scalar Particles with the NA64 Experiment*, Phys. Rev. Lett. **125** (2020) 081801 [2005.02710].

[144] Belle-II Collaboration, F. Abudinén et al., *Search for Axion-Like Particles produced in $e^+e^-$ collisions at Belle II*, Phys. Rev. Lett. **125** (2020) 161806 [2007.13071].

[145] BESIII Collaboration, M. Ablikim et al., *Search for an axion-like particle in $J/\psi$ radiative decays*, 2211.12699.

[146] CMS Collaboration, A. M. Sirunyan et al., *Evidence for light-by-light scattering and searches for axion-like particles in ultraperipheral PbPb collisions at $\sqrt{s_{\rm NN}} = 5.02$ TeV*, Phys. Lett. B **797** (2019) 134826 [1810.04602].

[147] J. Jaeckel and M. Spannowsky, *Probing MeV to 90 GeV axion-like particles with LEP and LHC*, Phys. Lett. B **753** (2016) 482 [1509.00476].

[148] S. Knapen, T. Lin, H. K. Lou and T. Melia, *Searching for Axionlike Particles with Ultraperipheral Heavy-Ion Collisions*, Phys. Rev. Lett. **118** (2017) 171801 [1607.06083].

[149] NOMAD Collaboration, P. Astier et al., *Search for eV (pseudo)scalar penetrating particles in the SPS neutrino beam*, Phys. Lett. B **479** (2000) 371.

[150] PrimEx Collaboration, I. Larin et al., *A New Measurement of the $\pi^0$ Radiative Decay Width*, Phys. Rev. Lett. **106** (2011) 162303 [1009.1681].

[151] D. Aloni, C. Fanelli, Y. Soreq and M. Williams, *Photoproduction of Axionlike Particles*, Phys. Rev. Lett. **123** (2019) 071801 [1903.03586].

[152] J. B. Dent, B. Dutta, D. Kim, S. Liao, R. Mahapatra, K. Sinha and A. Thompson, *New Directions for Axion Searches via Scattering at Reactor Neutrino Experiments*, Phys. Rev. Lett. **124** (2020) 211804 [1912.05733].

[153] V. Brdar, B. Dutta, W. Jang, D. Kim, I. M. Shoemaker, Z. Tabrizi, A. Thompson and J. Yu, *Axionlike Particles at Future Neutrino Experiments: Closing the Cosmological Triangle*, Phys. Rev. Lett. **126** (2021) 201801 [2011.07054].

[154] FASER Collaboration, A. Ariga et al., *FASER's physics reach for long-lived particles*, Phys. Rev. D **99** (2019) 095011 [1811.12522].

[155] EDELWEISS Collaboration, E. Armengaud et al., *Searches for electron interactions induced by new physics in the EDELWEISS-III Germanium bolometers*, Phys. Rev. D **98** (2018) 082004 [1808.02340].

[156] T. Ikeda, A. Ito, K. Miuchi, J. Soda, H. Kurashige and Y. Shikano, *Axion search with quantum nondemolition detection of magnons*, Phys. Rev. D **105** (2022) 102004 [2102.08764].

[157] DarkSide Collaboration, P. Agnes et al., *Search for Dark Matter Particle Interactions with Electron Final States with DarkSide-50*, Phys. Rev. Lett. **130** (2023) 101002 [2207.11968].

[158] GERDA Collaboration, M. Agostini et al., *First Search for Bosonic Superweakly Interacting Massive Particles with Masses up to 1 MeV/c$^2$ with GERDA*, Phys. Rev. Lett. **125** (2020) 011801 [2005.14184].

[159] LUX Collaboration, D. S. Akerib et al., *First Searches for Axions and Axionlike Particles with the LUX Experiment*, Phys. Rev. Lett. **118** (2017) 261301 [1704.02297].

[160] PandaX Collaboration, C. Fu et al., *Limits on Axion Couplings from the First 80 Days of Data of the PandaX-II Experiment*, Phys. Rev. Lett. **119** (2017) 181806 [1707.07921].

[161] SuperCDMS Collaboration, T. Aralis et al., *Constraints on dark photons and axionlike particles from the SuperCDMS Soudan experiment*, Phys. Rev. D **101** (2020) 052008 [1911.11905]. [Erratum: Phys.Rev.D 103, 039901 (2021)].

[162] XENON Collaboration, E. Aprile et al., *Light Dark Matter Search with Ionization Signals in XENON1T*, Phys. Rev. Lett. **123** (2019) 251801 [1907.11485].

[163] XENON Collaboration, E. Aprile et al., *Excess electronic recoil events in XENON1T*, Phys. Rev. D **102** (2020) 072004 [2006.09721].

[164] (XENON Collaboration)††, XENON Collaboration, E. Aprile et al., *Search for New Physics in Electronic Recoil Data from XENONnT*, Phys. Rev. Lett. **129** (2022) 161805 [2207.11330].

[165] K. Van Tilburg, *Stellar basins of gravitationally bound particles*, Phys. Rev. D **104** (2021) 023019 [2006.12431].

[166] F. Capozzi and G. Raffelt, *Axion and neutrino bounds improved with new calibrations of the tip of the red-giant branch using geometric distance determinations*, Phys. Rev. D **102** (2020) 083007 [2007.03694].

[167] S. Chigusa, M. Hazumi, E. D. Herbschleb, N. Mizuochi and K. Nakayama, *Light Dark Matter Search with Nitrogen-Vacancy Centers in Diamonds*, 2302.12756.

[168] P. Gondolo and G. G. Raffelt, *Solar neutrino limit on axions and keV-mass bosons*, *Phys. Rev. D* **79** (2009) 107301 [0807.2926].

[169] S. Chigusa, T. Moroi and K. Nakayama, *Detecting light boson dark matter through conversion into a magnon*, *Phys. Rev. D* **101** (2020) 096013 [2001.10666].

[170] A. Mitridate, T. Trickle, Z. Zhang and K. M. Zurek, *Detectability of Axion Dark Matter with Phonon Polaritons and Magnons*, *Phys. Rev. D* **102** (2020) 095005 [2005.10256].

[171] DARWIN Collaboration, J. Aalbers et al., *DARWIN: towards the ultimate dark matter detector*, *JCAP* **11** (2016) 017 [1606.07001].

[172] LZ Collaboration, D. S. Akerib et al., *Projected sensitivities of the LUX-ZEPLIN experiment to new physics via low-energy electron recoils*, *Phys. Rev. D* **104** (2021) 092009 [2102.11740].

[173] N. Crescini et al., *Operation of a ferromagnetic axion haloscope at $m_a = 58\,\mu eV$*, *Eur. Phys. J. C* **78** (2018) 703 [1806.00310]. [Erratum: Eur.Phys.J.C 78, 813 (2018)].

[174] QUAX Collaboration, N. Crescini et al., *Axion search with a quantum-limited ferromagnetic haloscope*, *Phys. Rev. Lett.* **124** (2020) 171801 [2001.08940].

[175] I. M. Bloch, R. Essig, K. Tobioka, T. Volansky and T.-T. Yu, *Searching for Dark Absorption with Direct Detection Experiments*, *JHEP* **06** (2017) 087 [1608.02123].

[176] M. Giannotti, I. G. Irastorza, J. Redondo, A. Ringwald and K. Saikawa, *Stellar Recipes for Axion Hunters*, *JCAP* **10** (2017) 010 [1708.02111].

[177] R. Z. Ferreira, M. C. D. Marsh and E. Müller, *Do Direct Detection Experiments Constrain Axionlike Particles Coupled to Electrons?*, *Phys. Rev. Lett.* **128** (2022) 221302 [2202.08858].

[178] G. P. Centers et al., *Stochastic fluctuations of bosonic dark matter*, *Nature Commun.* **12** (2021) 7321 [1905.13650].

[179] V. M. Mostepanenko and G. L. Klimchitskaya, *The State of the Art in Constraining Axion-to-Nucleon Coupling and Non-Newtonian Gravity from Laboratory Experiments*, *Universe* **6** (2020) 147 [2009.04517].

[180] T. Wu et al., *Search for Axionlike Dark Matter with a Liquid-State Nuclear Spin Comagnetometer*, *Phys. Rev. Lett.* **122** (2019) 191302 [1901.10843].

[181] A. Garcon et al., *Constraints on bosonic dark matter from ultralow-field nuclear magnetic resonance*, *Sci. Adv.* **5** (2019) eaax4539 [1902.04644].

[182] C. Abel et al., *Search for Axionlike Dark Matter through Nuclear Spin Precession in Electric and Magnetic Fields*, *Phys. Rev. X* **7** (2017) 041034 [1708.06367].

[183] NASDUCK Collaboration, I. M. Bloch, G. Ronen, R. Shaham, O. Katz, T. Volansky and O. Katz, *New constraints on axion-like dark matter using a Floquet quantum detector*, *Sci. Adv.* **8** (2022) abl8919 [2105.04603].

[184] NASDUCK Collaboration, I. M. Bloch, R. Shaham, Y. Hochberg, E. Kuflik, T. Volansky and O. Katz, *NASDUCK SERF: New constraints on axion-like dark matter from a SERF comagnetometer*, 2209.13588.

[185] C. Abel et al., *Search for ultralight axion dark matter in a side-band analysis of a 199Hg free-spin precession signal*, 2212.02403.

[186] G. Vasilakis, J. M. Brown, T. W. Kornack and M. V. Romalis, *Limits on New Long Range Nuclear Spin-Dependent Forces Set with a K-He3 Comagnetometer*, *Phys. Rev. Lett.* **103** (2009) 261801 [0809.4700].

[187] J. Lee, M. Lisanti, W. A. Terrano and M. Romalis, *Laboratory Constraints on the Neutron-Spin Coupling of feV-scale Axions*, 2209.03289.

[188] JEDI Collaboration, S. Karanth et al., *First Search for Axion-Like Particles in a Storage Ring Using a Polarized Deuteron Beam*, 2208.07293.

[189] I. M. Bloch, Y. Hochberg, E. Kuflik and T. Volansky, *Axion-like Relics: New Constraints from Old Comagnetometer Data*, *JHEP* **01** (2020) 167 [1907.03767].

[190] E. G. Adelberger, B. R. Heckel, S. A. Hoedl, C. D. Hoyle, D. J. Kapner and A. Upadhye, *Particle Physics Implications of a Recent Test of the Gravitational Inverse Sqaure Law*, *Phys. Rev. Lett.* **98** (2007) 131104 [hep-ph/0611223].

[191] M. Buschmann, C. Dessert, J. W. Foster, A. J. Long and B. R. Safdi, *Upper Limit on the QCD Axion Mass from Isolated Neutron Star Cooling*, *Phys. Rev. Lett.* **128** (2022) 091102 [2111.09892].

[192] M. V. Beznogov, E. Rrapaj, D. Page and S. Reddy, *Constraints on Axion-like Particles and Nucleon Pairing in Dense Matter from the Hot Neutron Star in HESS J1731-347*, *Phys. Rev. C* **98** (2018) 035802 [1806.07991].

[193] P. Carenza, T. Fischer, M. Giannotti, G. Guo, G. Martínez-Pinedo and A. Mirizzi, *Improved axion emissivity from a supernova via nucleon-nucleon bremsstrahlung*, *JCAP* **10** (2019) 016 [1906.11844]. [Erratum: JCAP 05, E01 (2020)].

[194] A. Bhusal, N. Houston and T. Li, *Searching for Solar Axions Using Data from the Sudbury Neutrino Observatory*, *Phys. Rev. Lett.* **126** (2021) 091601 [2004.02733].

[195] P. W. Graham, S. Hacıömeroğlu, D. E. Kaplan, Z. Omarov, S. Rajendran and Y. K. Semertzidis, *Storage ring probes of dark matter and dark energy*, *Phys. Rev. D* **103** (2021) 055010 [2005.11867].

[196] C. Gao, W. Halperin, Y. Kahn, M. Nguyen, J. Schütte-Engel and J. W. Scott, *Axion Wind Detection with the Homogeneous Precession Domain of Superfluid Helium-3*, *Phys. Rev. Lett.* **129** (2022) 211801 [2208.14454].

[197] P. J. Fox, N. Weiner and H. Xiao, *Recurrent Axinovae and their Cosmological Constraints*, 2302.00685.

[198] I. Schulthess et al., *New Limit on Axionlike Dark Matter Using Cold Neutrons*, *Phys. Rev. Lett.* **129** (2022) 191801 [2204.01454].

[199] K. Blum, R. T. D'Agnolo, M. Lisanti and B. R. Safdi, *Constraining Axion Dark Matter with Big Bang Nucleosynthesis*, *Phys. Lett. B* **737** (2014) 30 [1401.6460].

[200] D. Aybas et al., *Search for Axionlike Dark Matter Using Solid-State Nuclear Magnetic Resonance*, *Phys. Rev. Lett.* **126** (2021) 141802 [2101.01241].

[201] T. S. Roussy et al., *Experimental Constraint on Axionlike Particles over Seven Orders of Magnitude in Mass*, *Phys. Rev. Lett.* **126** (2021) 171301 [2006.15787].

[202] X. Zhang, A. Banerjee, M. Leyser, G. Perez, S. Schiller, D. Budker and D. Antypas, *Search for ultralight dark matter with spectroscopy of radio-frequency atomic transitions*, 2212.04413.

[203] G. Lucente, L. Mastrototaro, P. Carenza, L. Di Luzio, M. Giannotti and A. Mirizzi, *Axion signatures from supernova explosions through the nucleon electric-dipole portal*, *Phys. Rev. D* **105** (2022) 123020 [2203.15812].

[204] L. Caloni, M. Gerbino, M. Lattanzi and L. Visinelli, *Novel cosmological bounds on thermally-produced axion-like particles*, *JCAP* **09** (2022) 021 [2205.01637].

[205] D. F. Jackson Kimball et al., *Overview of the Cosmic Axion Spin Precession Experiment (CASPEr)*, *Springer Proc. Phys.* **245** (2020) 105 [1711.08999].

[206] A. Hook and J. Huang, *Probing axions with neutron star inspirals and other stellar processes*, *JHEP* **06** (2018) 036 [1708.08464].

[207] L. Di Luzio, B. Gavela, P. Quilez and A. Ringwald, *Dark matter from an even lighter QCD axion: trapped misalignment*, *JCAP* **10** (2021) 001 [2102.01082].

[208] L. Di Luzio, B. Gavela, P. Quilez and A. Ringwald, *An even lighter QCD axion*, *JHEP* **05** (2021) 184 [2102.00012].

[209] J. Zhang, Z. Lyu, J. Huang, M. C. Johnson, L. Sagunski, M. Sakellariadou and H. Yang, *First Constraints on Nuclear Coupling of Axionlike Particles from the Binary Neutron Star Gravitational Wave Event GW170817*, *Phys. Rev. Lett.* **127** (2021) 161101 [2105.13963].

[210] A. Arvanitaki, A. Madden and K. Van Tilburg, *The Piezoaxionic Effect*, 2112.11466.

[211] R. Balkin, J. Serra, K. Springmann, S. Stelzl and A. Weiler, *White dwarfs as a probe of light QCD axions*, 2211.02661.

[212] M. Baryakhtar, M. Galanis, R. Lasenby and O. Simon, *Black hole superradiance of self-interacting scalar fields*, *Phys. Rev. D* **103** (2021) 095019 [2011.11646].

[213] M. J. Stott, *Ultralight Bosonic Field Mass Bounds from Astrophysical Black Hole Spin*, 2009.07206.

[214] C. Ünal, F. Pacucci and A. Loeb, *Properties of ultralight bosons from heavy quasar spins via superradiance*, *JCAP* **05** (2021) 007 [2012.12790].

[215] V. Cardoso, O. J. C. Dias, G. S. Hartnett, M. Middleton, P. Pani and J. E. Santos, *Constraining the mass of dark photons and axion-like particles through black-hole superradiance*, *JCAP* **03** (2018) 043 [1801.01420].

[216] G. Ballesteros, J. Redondo, A. Ringwald and C. Tamarit, *Unifying inflation with the axion, dark matter, baryogenesis and the seesaw mechanism*, *Phys. Rev. Lett.* **118** (2017) 071802 [1608.05414].

[217] M. Buschmann, J. W. Foster and B. R. Safdi, *Early-Universe Simulations of the Cosmological Axion*, *Phys. Rev. Lett.* **124** (2020) 161103 [1906.00967].

[218] M. Buschmann, J. W. Foster, A. Hook, A. Peterson, D. E. Willcox, W. Zhang and B. R. Safdi, *Dark matter from axion strings with adaptive mesh refinement*, *Nature Commun.* **13** (2022) 1049 [2108.05368].

[219] C. Bonati, M. D'Elia, M. Mariti, G. Martinelli, M. Mesiti, F. Negro, F. Sanfilippo and G. Villadoro, *Axion phenomenology and $\theta$-dependence from $N_f = 2 + 1$ lattice QCD*, *JHEP* **03** (2016) 155 [1512.06746].

[220] S. Borsanyi et al., *Calculation of the axion mass based on high-temperature lattice quantum chromodynamics*, *Nature* **539** (2016) 69 [1606.07494].

[221] E. Berkowitz, M. I. Buchoff and E. Rinaldi, *Lattice QCD input for axion cosmology*, *Phys. Rev. D* **92** (2015) 034507 [1505.07455].

[222] M. Dine, P. Draper, L. Stephenson-Haskins and D. Xu, *Axions, Instantons, and the Lattice*, *Phys. Rev. D* **96** (2017) 095001 [1705.00676].

[223] P. Petreczky, H.-P. Schadler and S. Sharma, *The topological susceptibility in finite temperature QCD and axion cosmology*, *Phys. Lett. B* **762** (2016) 498 [1606.03145].

[224] L. Fleury and G. D. Moore, *Axion dark matter: strings and their cores*, *JCAP* **01** (2016) 004 [1509.00026].

[225] V. B. . Klaer and G. D. Moore, *The dark-matter axion mass*, *JCAP* **11** (2017) 049 [1708.07521].

[226] M. Gorghetto, E. Hardy and H. Nicolaescu, *Observing invisible axions with gravitational waves*, *JCAP* **06** (2021) 034 [2101.11007].

[227] R. T. Co, L. J. Hall and K. Harigaya, *Predictions for Axion Couplings from ALP Cogenesis*, *JHEP* **01** (2021) 172 [2006.04809].

[228] N. Blinov, M. J. Dolan, P. Draper and J. Kozaczuk, *Dark matter targets for axionlike particle searches*, *Phys. Rev. D* **100** (2019) 015049 [1905.06952].

[229] P. Arias, D. Cadamuro, M. Goodsell, J. Jaeckel, J. Redondo and A. Ringwald, *WISPy Cold Dark Matter*, *JCAP* **06** (2012) 013 [1201.5902].

[230] C. A. J. O'Hare, G. Pierobon, J. Redondo and Y. Y. Y. Wong, *Simulations of axionlike particles in the postinflationary scenario*, *Phys. Rev. D* **105** (2022) 055025 [2112.05117].

[231] C. A. J. O'Hare and E. Vitagliano, *Cornering the axion with CP-violating interactions*, *Phys. Rev. D* **102** (2020) 115026 [2010.03889].

[232] E. Hardy and R. Lasenby, *Stellar cooling bounds on new light particles: plasma mixing effects*, *JHEP* **02** (2017) 033 [1611.05852].

[233] J. Bergé, P. Brax, G. Métris, M. Pernot-Borràs, P. Touboul and J.-P. Uzan, *MICROSCOPE Mission: First Constraints on the Violation of the Weak Equivalence Principle by a Light Scalar Dilaton*, *Phys. Rev. Lett.* **120** (2018) 141101 [1712.00483].

[234] G. L. Smith, C. D. Hoyle, J. H. Gundlach, E. G. Adelberger, B. R. Heckel and H. E. Swanson, *Short range tests of the equivalence principle*, *Phys. Rev. D* **61** (2000) 022001.

[235] D. J. Kapner, T. S. Cook, E. G. Adelberger, J. H. Gundlach, B. R. Heckel, C. D. Hoyle and H. E. Swanson, *Tests of the gravitational inverse-square law below the dark-energy length scale*, *Phys. Rev. Lett.* **98** (2007) 021101 [hep-ph/0611184].

[236] J. Lee, E. Adelberger, T. Cook, S. Fleischer and B. Heckel, *New Test of the Gravitational $1/r^2$ Law at Separations down to 52 $\mu$m*, *Phys. Rev. Lett.* **124** (2020) 101101 [2002.11761].

[237] J. K. Hoskins, R. D. Newman, R. Spero and J. Schultz, *Experimental tests of the gravitational inverse square law for mass separations from 2-cm to 105-cm*, *Phys. Rev. D* **32** (1985) 3084.

[238] J. Ke, J. Luo, C.-G. Shao, Y.-J. Tan, W.-H. Tan and S.-Q. Yang, *Combined Test of the Gravitational Inverse-Square Law at the Centimeter Range*, *Phys. Rev. Lett.* **126** (2021) 211101.

[239] L.-C. Tu, S.-G. Guan, J. Luo, C.-G. Shao and L.-X. Liu, *Null Test of Newtonian Inverse-Square Law at Submillimeter Range with a Dual-Modulation Torsion Pendulum*, *Phys. Rev. Lett.* **98** (2007) 201101.

[240] S.-Q. Yang, B.-F. Zhan, Q.-L. Wang, C.-G. Shao, L.-C. Tu, W.-H. Tan and J. Luo, *Test of the Gravitational Inverse Square Law at Millimeter Ranges*, *Phys. Rev. Lett.* **108** (2012) 081101.

[241] W.-H. Tan et al., *Improvement for Testing the Gravitational Inverse-Square Law at the Submillimeter Range*, *Phys. Rev. Lett.* **124** (2020) 051301.

[242] W.-H. Tan et al., *New Test of the Gravitational Inverse-Square Law at the Submillimeter Range with Dual Modulation and Compensation*, *Phys. Rev. Lett.* **116** (2016) 131101.

[243] A. A. Geraci, S. J. Smullin, D. M. Weld, J. Chiaverini and A. Kapitulnik, *Improved constraints on non-Newtonian forces at 10 microns*, *Phys. Rev. D* **78** (2008) 022002 [0802.2350].

[244] Y.-J. Chen, W. Tham, D. Krause, D. Lopez, E. Fischbach and R. Decca, *Stronger Limits on Hypothetical Yukawa Interactions in the 30–8000 nm Range*, *Phys. Rev. Lett.* **116** (2016) 221102 [1410.7267].

[245] B. R. Heckel, E. Adelberger, C. Cramer, T. Cook, S. Schlamminger and U. Schmidt, *Preferred-Frame and CP-Violation Tests with Polarized Electrons*, *Phys. Rev. D* **78** (2008) 092006 [0808.2673].

[246] D. J. Wineland, J. J. Bollinger, D. J. Heinzen, W. M. Itano and M. G. Raizen, *Search for anomalous spin-dependent forces using stored-ion spectroscopy*, *Phys. Rev. Lett.* **67** (1991) 1735.

[247] J. Lee, A. Almasi and M. Romalis, *Improved Limits on Spin-Mass Interactions*, *Phys. Rev. Lett.* **120** (2018) 161801 [1801.02757].

[248] N. Crescini, C. Braggio, G. Carugno, P. Falferi, A. Ortolan and G. Ruoso, *The QUAX-$g_p$ $g_s$ experiment to search for monopole-dipole Axion interaction*, *Nucl. Instrum. Meth. A* **842** (2017) 109 [1606.04751].

[249] N. Crescini, C. Braggio, G. Carugno, P. Falferi, A. Ortolan and G. Ruoso, *Improved constraints on monopole-dipole interaction mediated by pseudo-scalar bosons*, *Phys. Lett. B* **773** (2017) 677 [1705.06044].

[250] N. Crescini, G. Carugno, P. Falferi, A. Ortolan, G. Ruoso and C. C. Speake, *Search of spin-dependent fifth forces with precision magnetometry*, *Phys. Rev. D* **105** (2022) 022007 [2011.07100].

[251] W. Terrano, E. Adelberger, J. Lee and B. Heckel, *Short-range spin-dependent interactions of electrons: a probe for exotic pseudo-Goldstone bosons*, *Phys. Rev. Lett.* **115** (2015) 201801 [1508.02463].

[252] S. A. Hoedl, F. Fleischer, E. G. Adelberger and B. R. Heckel, *Improved Constraints on an Axion-Mediated Force*, *Phys. Rev. Lett.* **106** (2011) 041801.

[253] XENON Collaboration, E. Aprile et al., *Light Dark Matter Search with Ionization Signals in XENON1T*, *Phys. Rev. Lett.* **123** (2019) 251801 [1907.11485].

[254] S. Zhang, Z. Ba, D. Ning, N. Zhai, Z. Lu and D. Sheng, *Search for spin-dependent gravitational interactions at the Earth range*, 2303.10352.

[255] Y. Feng, D. Ning, S. Zhang, Z. Lu and D. Sheng, *Search for Monopole-Dipole Interactions at the Submillimeter Range with a Xe129-Xe131-Rb Comagnetometer*, *Phys. Rev. Lett.* **128** (2022) 231803 [2205.13237].

[256] B. Venema, P. Majumder, S. Lamoreaux, B. Heckel and E. Fortson, *Search for a coupling of the Earth's gravitational field to nuclear spins in atomic mercury*, *Phys. Rev. Lett.* **68** (1992) 135.

[257] M. Safronova, D. Budker, D. DeMille, D. F. J. Kimball, A. Derevianko and C. Clark, *Search for New Physics with Atoms and Molecules*, *Rev. Mod. Phys.* **90** (2018) 025008 [1710.01833].

[258] K. Tullney et al., *Constraints on Spin-Dependent Short-Range Interaction between Nucleons*, *Phys. Rev. Lett.* **111** (2013) 100801 [1303.6612].

[259] L. Y. Wu, K. Y. Zhang, M. Peng, J. Gong and H. Yan, *Using the Sun and the Moon as Source masses and the Earth's Rotation as a Modulation to Search for Exotic Spin-Dependent Interactions at Astronomical Distances*, 2302.09096.

[260] A. Arvanitaki and A. A. Geraci, *Resonantly Detecting Axion-Mediated Forces with Nuclear Magnetic Resonance*, *Phys. Rev. Lett.* **113** (2014) 161801 [1403.1290].

[261] K. Wei, T. Zhao, X. Fang, Z. Xu, C. Liu, Q. Cao, A. Wickenbrock, Y. Hu, W. Ji and D. Budker, *Ultrasensitive Atomic Comagnetometer with Enhanced Nuclear Spin Coherence*, *Phys. Rev. Lett.* **130** (2023) 063201 [2210.09027].

[262] A. Hees, O. Minazzoli, E. Savalle, Y. V. Stadnik and P. Wolf, *Violation of the equivalence principle from light scalar dark matter*, *Phys. Rev. D* **98** (2018) 064051 [1807.04512].

[263] E. G. Adelberger, B. R. Heckel and A. E. Nelson, *Tests of the gravitational inverse square law*, *Ann. Rev. Nucl. Part. Sci.* **53** (2003) 77 [hep-ph/0307284].

[264] E. Fischbach and C. Talmadge, *Ten years of the fifth force*, in *31st Rencontres de Moriond: Dark Matter and Cosmology, Quantum Measurements and Experimental Gravitation*, pp. 443–451, 1996, hep-ph/9606249.

[265] A. Fienga and O. Minazzoli, *Testing GR and alternative theories with planetary ephemerides*, 2303.01821.

[266] A. S. Konopliv, S. W. Asmar, W. M. Folkner, Özgür Karatekin, D. C. Nunes, S. E. Smrekar, C. F. Yoder and M. T. Zuber, *Mars high resolution gravity fields from mro, mars seasonal gravity, and other dynamical parameters*, *Icarus* **211** (2011) 401.

[267] A. Branca et al., *Search for an Ultralight Scalar Dark Matter Candidate with the AURIGA Detector*, *Phys. Rev. Lett.* **118** (2017) 021302 [1607.07327].

[268] BACON Collaboration, K. Beloy et al., *Frequency Ratio Measurements with 18-digit Accuracy Using a Network of Optical Clocks*, 2005.14694.

[269] O. Tretiak, X. Zhang, N. L. Figueroa, D. Antypas, A. Brogna, A. Banerjee, G. Perez and D. Budker, *Improved Bounds on Ultralight Scalar Dark Matter in the Radio-Frequency Range*, *Phys. Rev. Lett.* **129** (2022) 031301 [2201.02042].

[270] E. Savalle, A. Hees, F. Frank, E. Cantin, P.-E. Pottie, B. M. Roberts, L. Cros, B. T. Mcallister and P. Wolf, *Searching for Dark Matter with an Optical Cavity and an Unequal-Delay Interferometer*, *Phys. Rev. Lett.* **126** (2021) 051301 [2006.07055].

[271] K. Van Tilburg, N. Leefer, L. Bougas and D. Budker, *Search for ultralight scalar dark matter with atomic spectroscopy*, *Phys. Rev. Lett.* **115** (2015) 011802 [1503.06886].

[272] S. Aharony, N. Akerman, R. Ozeri, G. Perez, I. Savoray and R. Shaniv, *Constraining Rapidly Oscillating Scalar Dark Matter Using Dynamic Decoupling*, *Phys. Rev. D* **103** (2021) 075017 [1902.02788].

[273] S. M. Vermeulen et al., *Direct limits for scalar field dark matter from a gravitational-wave detector*, *Nature* **600** (2021) 424 [2103.03783].

[274] K. Fukusumi, S. Morisaki and T. Suyama, *Upper limit on scalar field dark matter from LIGO-Virgo third observation run*, 2303.13088.

[275] L. Aiello, J. W. Richardson, S. M. Vermeulen, H. Grote, C. Hogan, O. Kwon and C. Stoughton, *Constraints on Scalar Field Dark Matter from Colocated Michelson Interferometers*, *Phys. Rev. Lett.* **128** (2022) 121101 [2108.04746].

[276] W. M. Campbell, B. T. McAllister, M. Goryachev, E. N. Ivanov and M. E. Tobar, *Searching for Scalar Dark Matter via Coupling to Fundamental Constants with Photonic, Atomic and Mechanical Oscillators*, *Phys. Rev. Lett.* **126** (2021) 071301 [2010.08107].

[277] M. Filzinger, S. Dörscher, R. Lange, J. Klose, M. Steinel, E. Benkler, E. Peik, C. Lisdat and N. Huntemann, *Improved limits on the coupling of ultralight bosonic dark matter to photons from optical atomic clock comparisons*, 2301.03433.

[278] R. Oswald et al., *Search for Dark-Matter-Induced Oscillations of Fundamental Constants Using Molecular Spectroscopy*, *Phys. Rev. Lett.* **129** (2022) 031302 [2111.06883].

[279] A. Hees, J. Guéna, M. Abgrall, S. Bize and P. Wolf, *Searching for an oscillating massive scalar field as a dark matter candidate using atomic hyperfine frequency comparisons*, *Phys. Rev. Lett.* **117** (2016) 061301 [1604.08514].

[280] C. J. Kennedy, E. Oelker, J. M. Robinson, T. Bothwell, D. Kedar, W. R. Milner, G. E. Marti, A. Derevianko and J. Ye, *Precision Metrology Meets Cosmology: Improved Constraints on Ultralight Dark Matter from Atom-Cavity Frequency Comparisons*, *Phys. Rev. Lett.* **125** (2020) 201302 [2008.08773].

[281] N. Sherrill et al., *Analysis of atomic-clock data to constrain variations of fundamental constants*, 2302.04565.

[282] L. Badurina, O. Buchmueller, J. Ellis, M. Lewicki, C. McCabe and V. Vaskonen, *Prospective sensitivities of atom interferometers to gravitational waves and ultralight dark matter*, *Phil. Trans. A. Math. Phys. Eng. Sci.* **380** (2021) 20210060 [2108.02468].

[283] A. Arvanitaki, S. Dimopoulos and K. Van Tilburg, *Sound of Dark Matter: Searching for Light Scalars with Resonant-Mass Detectors*, *Phys. Rev. Lett.* **116** (2016) 031102 [1508.01798].

[284] MAGIS-100 Collaboration, M. Abe et al., *Matter-wave Atomic Gradiometer Interferometric Sensor (MAGIS-100)*, *Quantum Sci. Technol.* **6** (2021) 044003 [2104.02835].

[285] D. Antypas et al., *New Horizons: Scalar and Vector Ultralight Dark Matter*, 2203.14915.

[286] J. Manley, D. Wilson, R. Stump, D. Grin and S. Singh, *Searching for Scalar Dark Matter with Compact Mechanical Resonators*, *Phys. Rev. Lett.* **124** (2020) 151301 [1910.07574].

[287] S. Bottaro, A. Caputo, G. Raffelt and E. Vitagliano, *Stellar limits on scalars from electron-nucleus bremsstrahlung*, 2303.00778.

[288] T. Kobayashi et al., *Search for Ultralight Dark Matter from Long-Term Frequency Comparisons of Optical and Microwave Atomic Clocks*, *Phys. Rev. Lett.* **129** (2022) 241301 [2212.05721].

[289] D. Brzeminski, Z. Chacko, A. Dev, I. Flood and A. Hook, *Searching for a fifth force with atomic and nuclear clocks*, *Phys. Rev. D* **106** (2022) 095031 [2207.14310].

[290] A. Arvanitaki, J. Huang and K. Van Tilburg, *Searching for dilaton dark matter with atomic clocks*, *Phys. Rev. D* **91** (2015) 015015 [1405.2925].

[291] A. A. Geraci, C. Bradley, D. Gao, J. Weinstein and A. Derevianko, *Searching for Ultralight Dark Matter with Optical Cavities*, *Phys. Rev. Lett.* **123** (2019) 031304 [1808.00540].

[292] I. Kozyryev, Z. Lasner and J. M. Doyle, *Enhanced sensitivity to ultralight bosonic dark matter in the spectra of the linear radical SrOH*, *Phys. Rev. A* **103** (2021) 043313 [1805.08185].

[293] D. E. Kaplan, A. Mitridate and T. Trickle, *Constraining fundamental constant variations from ultralight dark matter with pulsar timing arrays*, *Phys. Rev. D* **106** (2022) 035032 [2205.06817].

[294] M. Bordag, U. Mohideen and V. M. Mostepanenko, *New developments in the Casimir effect*, *Phys. Rept.* **353** (2001) 1 [quant-ph/0106045].

[295] R. S. Decca, D. Lopez, H. B. Chan, E. Fischbach, D. E. Krause and C. R. Jamell, *Constraining new forces in the Casimir regime using the isoelectronic technique*, *Phys. Rev. Lett.* **94** (2005) 240401 [hep-ph/0502025].

[296] A. O. Sushkov, W. J. Kim, D. A. R. Dalvit and S. K. Lamoreaux, *New Experimental Limits on Non-Newtonian Forces in the Micrometer Range*, *Phys. Rev. Lett.* **107** (2011) 171101 [1108.2547].

[297] T. A. Wagner, S. Schlamminger, J. H. Gundlach and E. G. Adelberger, *Torsion-balance tests of the weak equivalence principle*, *Class. Quant. Grav.* **29** (2012) 184002 [1207.2442].

[298] E. G. Adelberger, J. H. Gundlach, B. R. Heckel, S. Hoedl and S. Schlamminger, *Torsion balance experiments: A low-energy frontier of particle physics*, *Prog. Part. Nucl. Phys.* **62** (2009) 102.

[299] MICROSCOPE Collaboration, P. Touboul et al., *MICROSCOPE Mission: Final Results of the Test of the Equivalence Principle*, *Phys. Rev. Lett.* **129** (2022) 121102 [2209.15487].

[300] E. J. Chun and S. Yun, *Particle dispersion in the classical vector dark matter background*, *Phys. Rev. D* **106** (2022) 095027 [2205.03617].

[301] E. A. Shaw, M. P. Ross, C. A. Hagedorn, E. G. Adelberger and J. H. Gundlach, *Torsion-balance search for ultralow-mass bosonic dark matter*, *Phys. Rev. D* **105** (2022) 042007 [2109.08822].

[302] LIGO Scientific, KAGRA, Virgo Collaboration, R. Abbott et al., *Constraints on dark photon dark matter using data from LIGO's and Virgo's third observing run*, *Phys. Rev. D* **105** (2022) 063030 [2105.13085].

[303] M. A. Fedderke and A. Mathur, *Asteroids for ultralight dark-photon dark-matter detection*, 2210.09324.

[304] J. Manley, M. D. Chowdhury, D. Grin, S. Singh and D. J. Wilson, *Searching for vector dark matter with an optomechanical accelerometer*, *Phys. Rev. Lett.* **126** (2021) 061301 [2007.04899].

[305] P. W. Graham, D. E. Kaplan, J. Mardon, S. Rajendran and W. A. Terrano, *Dark Matter Direct Detection with Accelerometers*, *Phys. Rev. D* **93** (2016) 075029 [1512.06165].

[306] H. Ahlers et al., *STE-QUEST: Space Time Explorer and QUantum Equivalence principle Space Test*, 2211.15412.

[307] A. Caputo, A. J. Millar, C. A. J. O'Hare and E. Vitagliano, *Dark photon limits: A handbook*, *Phys. Rev. D* **104** (2021) 095029 [2105.04565].

[308] A. S. Goldhaber and M. M. Nieto, *Photon and Graviton Mass Limits*, *Rev. Mod. Phys.* **82** (2010) 939 [0809.1003].

[309] E. R. Williams, J. E. Faller and H. A. Hill, *New experimental Test of Coulomb's Law: A Laboratory Upper Limit on the Photon Rest Mass*, *Phys. Rev. Lett.* **26** (1971) 721.

[310] D. F. Bartlett and S. Loegl, *Limits on an Electromagnetic Fifth Force*, *Phys. Rev. Lett.* **61** (1988) 2285.

[311] L.-C. Tu, J. Luo and G. T. Gillies, *The Mass of the Photon*, *Rept. Prog. Phys.* **68** (2005) 77.

[312] D. Kroff and P. C. Malta, *Constraining Hidden Photons via Atomic Force Microscope Measurements and the Plimpton-Lawton Experiment*, *Phys. Rev. D* **102** (2020) 095015 [2008.02209].

[313] S. J. Plimpton and W. E. Lawton, *A Very Accurate Test of Coulomb's Law of Force Between Charges*, *Phys. Rev.* **50** (1936) 1066.

[314] J. Jaeckel and S. Roy, *Spectroscopy as a Test of Coulomb's Law: A Probe of the Hidden Sector*, *Phys. Rev. D* **82** (2010) 125020 [1008.3536].

[315] A. S. Goldhaber and M. M. Nieto, *Terrestrial and Extra-Terrestrial Limits on the Photon Mass*, *Rev. Mod. Phys.* **43** (1971) 277.

[316] E. Fischbach, H. Kloor, R. A. Langel, A. T. Y. Liu and M. Peredo, *New geomagnetic limits on the photon mass and on long range forces coexisting with electromagnetism*, *Phys. Rev. Lett.* **73** (1994) 514.

[317] G. Marocco, *Dark photon limits from magnetic fields and astrophysical plasmas*, 2110.02875.

[318] L. Davis, Jr., A. S. Goldhaber and M. M. Nieto, *Limit on the Photon Mass Deduced from Pioneer-10 Observations of Jupiter's Magnetic Field*, *Phys. Rev. Lett.* **35** (1975) 1402.

[319] R. Bähre et al., *Any light particle search II —Technical Design Report*, *JINST* **8** (2013) T09001 [1302.5647].

[320] T. Inada, T. Namba, S. Asai, T. Kobayashi, Y. Tanaka, K. Tamasaku, K. Sawada and T. Ishikawa, *Results of a Search for Paraphotons with Intense X-ray Beams at SPring-8*, *Phys. Lett. B* **722** (2013) 301 [1301.6557].

[321] R. Povey, J. Hartnett and M. Tobar, *Microwave Cavity Light Shining Through a Wall Optimization and Experiment*, *Phys. Rev. D* **82** (2010) 052003 [1003.0964].

[322] S. R. Parker, J. G. Hartnett, R. G. Povey and M. E. Tobar, *Cryogenic Resonant Microwave Cavity Searches for Hidden Sector Photons*, *Phys. Rev. D* **88** (2013) 112004 [1410.5244].

[323] ADMX Collaboration, A. Wagner et al., *A Search for Hidden Sector Photons with ADMX*, *Phys. Rev. Lett.* **105** (2010) 171801 [1007.3766].

[324] A. Romanenko et al., *New Exclusion Limit for Dark Photons from an SRF Cavity-Based Search (Dark SRF)*, 2301.11512.

[325] A. Berlin et al., *Searches for New Particles, Dark Matter, and Gravitational Waves with SRF Cavities*, 2203.12714.

[326] M. Danilov, S. Demidov and D. Gorbunov, *Constraints on Hidden Photons Produced in Nuclear Reactors*, *Phys. Rev. Lett.* **122** (2019) 041801 [1804.10777].

[327] H.-S. Zechlin, D. Horns and J. Redondo, *New Constraints on Hidden Photons using Very High Energy Gamma-Rays from the Crab Nebula*, *AIP Conf. Proc.* **1085** (2009) 727 [0810.5501].

[328] A. Caputo, H. Liu, S. Mishra-Sharma and J. T. Ruderman, *Dark Photon Oscillations in Our Inhomogeneous Universe*, *Phys. Rev. Lett.* **125** (2020) 221303 [2002.05165].

[329] A. Miyazaki, T. Lofnes, F. Caspers, P. Spagnolo, J. Jelonnek, T. Ruess, J. L. Steinmann and M. Thumm, *Millimeter-wave WISP search with coherent Light-Shining-Through-a-Wall towards the STAX project*, 2212.01139.

[330] J. Redondo, *Helioscope Bounds on Hidden Sector Photons*, *JCAP* **07** (2008) 008 [0801.1527].

[331] M. Schwarz, E.-A. Knabbe, A. Lindner, J. Redondo, A. Ringwald, M. Schneide, J. Susol and G. Wiedemann, *Results from the Solar Hidden Photon Search (SHIPS)*, *JCAP* **08** (2015) 011 [1502.04490].

[332] J. Frerick, F. Kahlhoefer and K. Schmidt-Hoberg, *$A'$ view of the sunrise: Boosting helioscopes with angular information*, 2211.00022.

[333] J. Redondo and G. Raffelt, *Solar Constraints on Hidden Photons Re-visited*, *JCAP* **08** (2013) 034 [1305.2920].

[334] D. K. Hong, C. S. Shin and S. Yun, *Cooling of young neutron stars and dark gauge bosons*, *Phys. Rev. D* **103** (2021) 123031 [2012.05427].

[335] N. Vinyoles, A. Serenelli, F. L. Villante, S. Basu, J. Redondo and J. Isern, *New Axion and Hidden Photon Constraints from a Solar Data Global Fit*, *JCAP* **10** (2015) 015 [1501.01639].

[336] (XENON Collaboration)§, XENON Collaboration, E. Aprile et al., *Emission of single and few electrons in XENON1T and limits on light dark matter*, *Phys. Rev. D* **106** (2022) 022001 [2112.12116].

[337] S. D. McDermott and S. J. Witte, *Cosmological Evolution of Light Dark Photon Dark Matter*, *Phys. Rev. D* **101** (2020) 063030 [1911.05086].

[338] S. J. Witte, S. Rosauro-Alcaraz, S. D. McDermott and V. Poulin, *Dark Photon Dark Matter in the Presence of Inhomogeneous Structure*, *JHEP* **06** (2020) 132 [2003.13698].

[339] A. Caputo, H. Liu, S. Mishra-Sharma and J. T. Ruderman, *Modeling Dark Photon Oscillations in Our Inhomogeneous Universe*, *Phys. Rev. D* **102** (2020) 103533 [2004.06733].

[340] S. Dubovsky and G. Hernández-Chifflet, *Heating up the Galaxy with Hidden Photons*, *JCAP* **12** (2015) 054 [1509.00039].

[341] D. Wadekar and G. R. Farrar, *Gas-rich dwarf galaxies as a new probe of dark matter interactions with ordinary matter*, *Phys. Rev. D* **103** (2021) 123028 [1903.12190].

[342] A. Bhoonah, J. Bramante and N. Song, *Superradiant Searches for Dark Photons in Two Stage Atomic Transitions*, *Phys. Rev. D* **101** (2020) 055040 [1909.07387].

[343] DAMIC Collaboration, A. Aguilar-Arevalo et al., *Constraints on Light Dark Matter Particles Interacting with Electrons from DAMIC at SNOLAB*, *Phys. Rev. Lett.* **123** (2019) 181802 [1907.12628].

[344] B. Godfrey et al., *Search for dark photon dark matter: Dark E field radio pilot experiment*, *Phys. Rev. D* **104** (2021) 012013 [2101.02805].

[345] A. Phipps et al., *Exclusion Limits on Hidden-Photon Dark Matter near 2 neV from a Fixed-Frequency Superconducting Lumped-Element Resonator*, *Springer Proc. Phys.* **245** (2020) 139 [1906.08814].

[346] DOSUE-RR Collaboration, S. Kotaka et al., *Search for dark photon cold dark matter in the mass range* 74–110 $\mu$eV$/c^2$ *with a cryogenic millimeter-wave receiver*, 2205.03679.

[347] H. An, S. Ge, W.-Q. Guo, X. Huang, J. Liu and Z. Lu, *Direct detection of dark photon dark matter using radio telescopes*, 2207.05767.

[348] FUNK Experiment Collaboration, A. Andrianavalomahefa et al., *Limits from the Funk Experiment on the Mixing Strength of Hidden-Photon Dark Matter in the Visible and Near-Ultraviolet Wavelength Range*, *Phys. Rev. D* **102** (2020) 042001 [2003.13144].

[349] J. Chiles et al., *New Constraints on Dark Photon Dark Matter with Superconducting Nanowire Detectors in an Optical Haloscope*, *Phys. Rev. Lett.* **128** (2022) 231802 [2110.01582].

[350] H. An, X. Chen, S. Ge, J. Liu and Y. Luo, *Searching for Ultralight Dark Matter Conversion in Solar Corona using LOFAR Data*, 2301.03622.

[351] L. Manenti et al., *Search for dark photons using a multilayer dielectric haloscope equipped with a single-photon avalanche diode*, *Phys. Rev. D* **105** (2022) 052010 [2110.10497].

[352] B. T. McAllister, A. Quiskamp, C. O'Hare, P. Altin, E. Ivanov, M. Goryachev and M. Tobar, *Limits on Dark Photons, Scalars, and Axion-Electromagnetodynamics with The ORGAN Experiment*, 2212.01971.

[353] R. Cervantes et al., *Search for 70 μeV Dark Photon Dark Matter with a Dielectrically Loaded Multiwavelength Microwave Cavity*, *Phys. Rev. Lett.* **129** (2022) 201301 [2204.03818].

[354] K. Ramanathan, N. Klimovich, R. Basu Thakur, B. H. Eom, H. G. LeDuc, S. Shu, A. D. Beyer and P. K. Day, *Wideband Direct Detection Constraints on Hidden Photon Dark Matter with the QUALIPHIDE Experiment*, 2209.03419.

[355] X. Fan, G. Gabrielse, P. W. Graham, R. Harnik, T. G. Myers, H. Ramani, B. A. D. Sukra, S. S. Y. Wong and Y. Xiao, *One-Electron Quantum Cyclotron as a Milli-eV Dark-Photon Detector*, *Phys. Rev. Lett.* **129** (2022) 261801 [2208.06519].

[356] SENSEI Collaboration, L. Barak et al., *SENSEI: Direct-Detection Results on sub-GeV Dark Matter from a New Skipper-CCD*, *Phys. Rev. Lett.* **125** (2020) 171802 [2004.11378].

[357] P. Brun, L. Chevalier and C. Flouzat, *Direct Searches for Hidden-Photon Dark Matter with the SHUKET Experiment*, *Phys. Rev. Lett.* **122** (2019) 201801 [1905.05579].

[358] SuperCDMS Collaboration, T. Aralis et al., *Constraints on dark photons and axionlike particles from the SuperCDMS Soudan experiment*, *Phys. Rev. D* **101** (2020) 052008 [1911.11905]. [Erratum: Phys.Rev.D 103, 039901 (2021)].

[359] M. A. Fedderke, P. W. Graham, D. F. Jackson Kimball and S. Kalia, *Search for dark-photon dark matter in the SuperMAG geomagnetic field dataset*, *Phys. Rev. D* **104** (2021) 095032 [2108.08852].

[360] M. A. Fedderke, P. W. Graham, D. F. J. Kimball and S. Kalia, *Earth as a transducer for dark-photon dark-matter detection*, *Phys. Rev. D* **104** (2021) 075023 [2106.00022].

[361] A. V. Dixit, S. Chakram, K. He, A. Agrawal, R. K. Naik, D. I. Schuster and A. Chou, *Searching for Dark Matter with a Superconducting Qubit*, *Phys. Rev. Lett.* **126** (2021) 141302 [2008.12231].

[362] R. Cervantes, C. Braggio, B. Giaccone, D. Frolov, A. Grasselino, R. Harnik, O. Melnychuk, R. Pilipenko, S. Posen and A. Romanenko, *Deepest Sensitivity to Wavelike Dark Photon Dark Matter with SRF Cavities*, 2208.03183.

[363] J. Suzuki, T. Horie, Y. Inoue and M. Minowa, *Experimental Search for Hidden Photon CDM in the eV mass range with a Dish Antenna*, *JCAP* **09** (2015) 042 [1504.00118].

[364] S. Knirck, T. Yamazaki, Y. Okesaku, S. Asai, T. Idehara and T. Inada, *First Results from a Hidden Photon Dark Matter Search in the meV Sector Using a Plane-Parabolic Mirror System*, *JCAP* **11** (2018) 031 [1806.05120].

[365] N. Tomita, S. Oguri, Y. Inoue, M. Minowa, T. Nagasaki, J. Suzuki and O. Tajima, *Search for Hidden-Photon Cold Dark Matter Using a K-Band Cryogenic Receiver*, *JCAP* **09** (2020) 012 [2006.02828].

[366] L. H. Nguyen, A. Lobanov and D. Horns, *First results from the WISPDMX Radio Frequency Cavity Searches for Hidden Photon Dark Matter*, *JCAP* **10** (2019) 014 [1907.12449].

[367] XENON Collaboration, E. Aprile et al., *Excess Electronic Recoil Events in XENON1T*, *Phys. Rev. D* **102** (2020) 072004 [2006.09721].

[368] I. M. Bloch, A. Caputo, R. Essig, D. Redigolo, M. Sholapurkar and T. Volansky, *Exploring New Physics with O(keV) Electron Recoils in Direct Detection Experiments*, *JHEP* **01** (2021) 178 [2006.14521].

[369] H. An, M. Pospelov, J. Pradler and A. Ritz, *New Limits on Dark Photons from Solar Emission and keV Scale Dark Matter*, *Phys. Rev. D* **102** (2020) 115022 [2006.13929].