

Dirk Dubbers

1. Selected more recent publications

Precise Measurements of the Decay of Free Neutrons

Dirk Dubbers, Bastian Märkisch

Annu. Rev. Nucl. Part. Sci. 71, 39–63 (2021)

arXiv:2106.02345 [nucl-ex]

doi.org/10.1146/annurev-nucl-102419-043156

Study of silicon photomultipliers for use in neutron decay experiments

D. Dubbers

Nucl. Inst. Meth. A 1009, 165456 (2021)

arXiv:2009.04855v2 [physics.ins-det]

doi.org/10.1016/j.nima.2021.165456

Comparison of underwater with conventional pumped hydro-energy storage systems

D. Dubbers

Journal of Energy Storage 35, 102283 (2021)

<https://engrxiv.org/pyvc4/>

doi.org/10.1016/j.est.2021.102283

Design of the Magnet System of the Neutron Decay Facility PERC

X. Wang, C. Ziener, H. Abele, S. Bodmaier, D. Dubbers, J. Erhart¹, A. Hollering, E. Jericha, J. Klenke, H. Fillunger, W. Heil, C. Klauser, G. Konrad, M. Lamparth, T. Lauer, M. Klopff, R. Maix, B. Märkisch, W. Mach, H. Mest³, D. Moser, A. Pethoukov, L. Raffelt³, N. Rebrova³, C. Roick, H. Saul, U. Schmidt, T. Soldner, R. Viroth, O. Zimmer (PERC Collaboration)

EPJ Web of Conferences 219, 04007 (2019)

arXiv:1905.10249 [physics.ins-det]

doi.org/10.1051/epjconf/201921904007

Exotic decay channels are not the cause of the neutron lifetime anomaly

D. Dubbers, H. Saul, B. Märkisch, T. Soldner, H. Abele

Phys. Lett. B, 791, 6 (2019)

arXiv:1812.00626 [nucl-ex]

doi.org/10.1016/j.physletb.2019.02.013

Measurement of the weak axial-vector coupling constant in the decay of free neutrons using a pulsed cold neutron beam

B. Märkisch, H. Mest, H. Saul, X. Wang, H. Abele, D. Dubbers, M. Klopff, A. Petoukhov, C. Roick, T. Soldner, D. Werder

Phys. Rev. Lett. 122, 242501 (2019), Editor's suggestion,

arXiv:1812.04666 [nucl-ex]

doi.org/10.1103/PhysRevLett.122.242501

Energiewende: Warum Deutschland sich verrechnet

D. Dubbers, J. Stachel, U. Uwer

Münchner Merkur Nr. 237, Seite 3, 14.10.2019

<https://www.merkur.de/wirtschaft/energiewende-warum-sich-deutschland-verrechnet-zr-13113065.html>

Energiewende: Fakten, Missverständnisse, Lösungen – ein Kommentar aus der Physik

D. Dubbers, J. Stachel, U. Uwer

<https://www.physi.uni-heidelberg.de/~dubbers/energiewende/text.pdf>

Comment on "Neutron Lifetime and Axial Coupling Constant" by A. Czarnecki et al, PRL 120, 202002 (2018)

Dirk Dubbers

arXiv:1807.07026 [hep-ph]

Electron time-of-flight: A new tool in β -decay spectroscopy

C. Roick, D. Dubbers, B. Märkisch, H. Saul, U. Schmidt

Phys. Rev. C 97, 035502 (2018), Editor's suggestion,

doi.org/10.1103/PhysRevC.97.035502

Fröhliche Wissenschaft – Von Neutronen und anderen wichtigen Dingen
D. Dubbers, in: *Heidelberger Physiker berichten*, Band 5, s. nächsten Eintrag,
<https://books.ub.uni-heidelberg.de/heibooks/catalog/book/371>

Heidelberger Physiker berichten – Kollegen blicken zurück auf erlebte Wissenschaft
Vorträge 1991-2018, 5 Bände, 932 Seiten
I. Appenzeller, D. Dubbers, H.-G. Siebig, A. Winnacker, Hrsg.
HeiBOOKS, Universitätsbibliothek Heidelberg, 2018

Gibt es überhaupt eine Energiewende?
D. Dubbers, in: *Geopferte Landschaften*, Georg Etscheit, Hrsg.,
Heyne Verlag, Random House, München, 2016

Magnetic guidance of charged particles
D. Dubbers
Phys. Lett. B 748, 306 (2015)
doi.org/10.1016/j.physletb.2015.07.004

Generation of narrow peaks in charged-particle magnetic spectroscopy
D. Dubbers, U. Schmidt
Nucl. Instr. Meth. A 763, 112 (2014)
doi.org/10.1016/j.nima.2016.09.004

Generalized spin precession equations
H.-J. Stöckmann, D. Dubbers
New J. Phys., 16, 053050 (2014)
doi.org/10.1088/1367-2630/16/5/053050

The present status of particle physics with slow neutrons
D. Dubbers
Physics Procedia 51, 13 (2014)
doi.org/10.1016/j.phpro.2013.12.005

The point spread function of electrons in a magnetic field
D. Dubbers, L. Raffelt, B. Märkisch, F. Friedl, H. Abele
Nucl. Instr. Meth. A 763, 112 (2014)
doi.org/10.1016/j.nima.2014.06.020

Quantum Physics: The Bottom-Up Approach
From the Simple Two-Level System to Irreducible Representations
D. Dubbers, H.-J. Stöckmann
Springer, Heidelberg 2013
[doi:10.1007/978-3-642-31060-7](https://doi.org/10.1007/978-3-642-31060-7)

Summary: Next generation experiments on the neutron lifetime
D. Dubbers, K.S. Kumar, J.M. Pendlebury
Workshop Santa Fe, New Mexico, 2012, World Scientific 2014
doi.org/10.1142/9789814571678_0017

Neutron decay with PERC: a progress report
G. Konrad et al. (The Perc collaboration)
J. Phys.: Conf. Ser. 340 012048 (2011)
doi.org/10.1088/1742-6596/340/1/012048

Ultra cold neutron quantum states
I. Antoniadis, S. Baessler, O. Bertolami, D. Dubbers, A. Meyerovich, V. Nesvizhevsky, K. Protasov,
S. Reynaud
Workshop Les Houches, France (2011)
doi.org/10.1016/j.crhy.2011.09.001

The neutron and its role in cosmology and particle physics
D. Dubbers, M. Schmidt
Rev. Mod. Phys. 83, 1111 (2011)
arXiv:1105.3694 [hep-ph]
[doi:10.1103/RevModPhys.83.1111](https://doi.org/10.1103/RevModPhys.83.1111)

2. Selected older publications

PERC, a clean, bright, and versatile source of neutron decay products

D. Dubbers, H. Abele, S. Baeßler, B. Märkisch, M. Schumann, T. Soldner, O. Zimmer

Nucl. Instr. Meth. A 596, 238-247 (2008)

arXiv:0709.4440

doi:10.1016/j.nima.2008.07.157

Quark mixing, CKM unitarity

H. Abele, E. Barberio, D. Dubbers, F. Glück, J.C. Hardy, W.J. Marciano, A. Serebrov, N. Severijns

Eur. Phys. J. C 33, 1 (2004)

doi.org/10.1140/epjc/s2003-01574-8

Is the unitarity of the quark-mixing CKM matrix violated in neutron beta-decay?

H. Abele, M. Astruc Hoffmann, S. Baeßler, D. Dubbers, F. Glück, U. Müller, V. Nesvizhevsky, J. Reich, O. Zimmer

Phys. Rev. Lett. 88, 211801 (2002)

doi:10.1103/PhysRevLett.88.211801

A long ballistic supermirror guide for cold neutrons at the ILL

H. Häse, A. Knöpfler, K. Fiederer, U. Schmidt, D. Dubbers, W. Kaiser

Nucl. Instr. Meth. 485, 453 (2002)

doi.org/10.1016/S0168-9002(01)02105-2

³He Spin Echo: New atomic beam technique for probing phenomena in the neV range

M. DeKieviet, D. Dubbers, C. Schmidt, D. Scholz, U. Spinola

Phys. Rev. Lett. 75, 1919 (1995)

doi:10.1103/PhysRevLett.75.1919

Geometric phases and hidden symmetries in simple resonators

H.-M. Lauber, P. Weidenhammer, D. Dubbers

Phys. Rev. Lett. 72, 1004 (1994)

doi:10.1103/PhysRevLett.72.1004

Spontaneous polarization of particles

U. Schmidt, G. Baum, D. Dubbers

Phys. Rev. Lett. 70, 3396 (1993)

doi:10.1103/PhysRevLett.70.3396

On the origin of the 17 keV neutrino signals, and a loss-free measurement of the ³⁵S β-spectrum

H. Abele, G. Helm, U. Kania, C. Schmidt, J. Last, D. Dubbers

Phys. Lett. B 316, 26 (1993)

doi:10.1016/0370-2693(93)90652-X

A new experimental limit on neutron-antineutron transitions

M. Baldo-Ceolin, P. Benetti, T. Bitter, F. Bobisut, E. Calligarich, R. Dolfini, D. Dubbers, P. E1-Muzeini,

M. Genoni, D. Gibin, A. Gigli Berzolari, K. Gobrecht, A. Guglielmi, J. Last, M. Laveder, W. Lippert,

F. Mattioli, F. Mauri, M. Mezzetto, C. Montanari, A. Piazzoli, G. Puglierin, A. Rappoldi, G.L. Raselli 4,

D. Scannicchio, A. Sconza, M. Vascon, L. Visentin

Phys. Lett. B 236, 95 (1990)

doi:10.1016/0370-2693(90)90601-2

Pulsed-beam neutron-lifetime measurement

J. Last, M. Arnold, J. Döhner, D. Dubbers, S.J. Freedman

Phys. Rev. Lett. 60, 995 (1988)

doi:10.1103/PhysRevLett.60.995

Manifestation of Berry's topological phase in neutron spin rotation

T. Bitter, D. Dubbers

Phys. Rev. Lett. 59, 251 (1987)

doi:10.1103/PhysRevLett.59.251

Dressed neutrons

E. Muskat, D. Dubbers, O. Schärpf

Phys. Rev. Lett. 58, 2047 (1987)

doi:10.1103/PhysRevLett.58.2047

Beta-decay asymmetry of the neutron and g_A/g_V

P. Bopp, D. Dubbers, L. Hornig, E. Klemt, J. Last, H. Schütze, S. J. Freedman, O. Schärpf

Phys. Rev. Lett. 56, 919 (1986)

doi:10.1103/PhysRevLett.56.919

The gradient elastic constant C_{44} of CaF_2 : a measurement of extremely small quadrupole coupling constants in a solid

D. Dubbers, H. Vogt, and A. Winnacker

Phys. Lett. A 99, 236 (1983)

doi.org/10.1016/0375-9601(83)90915-5

Irreducible spin precession theory applied to some topics in atomic and nuclear radio-frequency spectroscopy

D. Dubbers

Z. Phys. A 293, 211 (1979)

doi.org/10.1007/BF01435590

Multiple quantum NMR transitions of ^8Li ($T_{1/2} = 0.84$ s) in LiTaO_3 and the quadrupole moment of ^8Li

D. Dubbers, K. Dörr, H. Ackermann, F. Fujara, H. Grupp, M. Grupp, P. Heitjans, A. Körblein,

H. J. Stöckmann

Z. Phys. A 282, 243 (1977)

doi:10.1007/BF01414890

Sign of nuclear electric quadrupole coupling constants in solids from γ -ray anisotropy

D. Dubbers, H. Ackermann, M. Grupp, P. Heitjans, and H.-J. Stöckmann

Z. Phys. B 25, 363 (1976)

doi.org/10.1007/BF01315252

Nuclear reorientation in static and radio-frequency electro-magnetic fields

D. Dubbers

Z. Phys. A 276, 245 (1976)

doi.org/10.1007/BF01412102

3. Selected papers of group members until 2011

High frequency intensity oscillations at RESEDA using the CASCADE detector

W. Häussler, P. Böni, M. Klein, C.J. Schmidt, U. Schmidt, F. Groitl, J. Kindervater

Rev. Sci. Instr. 82, 045101 (2011)

doi:10.1063/1.3571300

Massive spin-momentum entanglement measured in an atomic beam spin echo experiment

F. Jeske, Th. Stöferle, M. DeKieviet

Eur. Phys. J. D 63, 25 (2011)

doi.org/10.1140/epjd/e2011-10705-4

Limit on Lorentz and CPT violation of the bound neutron using a $^3\text{He}/^{129}\text{Xe}$ comagnetometer

C. Gemmel, W. Heil, S. Karpuk, K. Lenz, Yu. Sobolev, K. Tullney, M. Burghoff, W. Kilian, S. Knappe-Grüneberg, W. Müller, A. Schnabel, F. Seifert, L. Trahms, U. Schmidt

Phys. Rev. D 82, 111901(R) (2010)

doi:10.1103/PhysRevD.82.111901

The new neutron decay spectrometer PERKEO III

B. Märkisch, H. Abele, D. Dubbers, F. Friedl, A. Kaplan, H. Mest, M. Schumann, T. Soldner, D. Wilkin

Nucl. Instr. Meth. A 611, 216 (2009)

doi:10.1016/j.nima.2009.07.066

Stability of Berry's Phase for a Spin-1/2 Particle

S. Filipp, J. Klepp, Y. Hasegawa, C. Plonka-Spehr, U. Schmidt, P. Geltenbort, H. Rauch

Phys. Rev. Lett 102 030404 1 (2009)

doi:10.1103/PhysRevLett.102.030404

Parity violation in hydrogen and longitudinal atomic beam spin echo I

T Bergmann, M. DeKieviet, T. Gasenzer, O. Nachtmann, M.-I. Trappe

Eur. J. D 54 551 (2009)

doi.org/10.1140/epjd/e2009-00179-4

Scalar Casimir-Polder forces for uniaxial corrugations

B. Dobrich, M. DeKieviet, H. Gies

Phys. Rev. D 78 125022 (2008)

doi:10.1103/PhysRevD.78.125022

The neutron. Its properties and basic interactions

H. Abele

Prog. Part. Nucl. Phys 60, 1-81 (2008)

doi:10.1016/j.pnpnp.2007.05.002

Measurement of the Proton Asymmetry Parameter C in Neutron Beta Decay

M. Schumann, M. Kreuz, M. Deissenroth, F. Glück, J. Krempel, B. Märkisch, D. Mund, A. Petoukhov, T. Soldner, H. Abele

Phys. Rev. Lett. 100, 151801 (2008)

doi:10.1103/PhysRevLett.100.151801

Measurement of the Neutrino Asymmetry Parameter B in Neutron Decay

M. Schumann, T. Soldner, M. Deissenroth, F. Glück, J. Krempel, M. Kreuz, B. Märkisch, D. Mund, A. Petoukhov, H. Abele

Phys. Rev. Lett. 99, 191803 (2007)

doi:10.1103/PhysRevLett.99.191803

New CP-Violation and Preferred-Frame Tests with Polarized Electrons

B. R. Heckel, C. E. Cramer, T. S. Cook, E. G. Adelberger, S. Schlamminger, U. Schmidt

Phys. Rev. Lett. 97, 021603 (2006)

doi:10.1103/PhysRevLett.97.021603

Experimental observation of quantum reflection far from threshold

V. Druzhinina, M. DeKieviet

Phys. Rev. Lett. 91, 193202 (2003)

doi:10.1103/PhysRevLett.91.193202

Neutron resonance spin echo using spin echo correction coils

W. Häussler, U. Schmidt, G. Ehlers, F. Mezei

Chemical Physics 292, 501-510 (2003)

doi:10.1016/S0301-0104(03)00119-8

Quantum states of neutrons in the Earth's gravitational field

V. Nesvizhevsky, H. Börner, A. Petukhov, H. Abele, S. Baeßler, F. Rueß, T. Stöferle, A. Westphal, et al.

Nature 415 299 (2002)

doi:10.1038/415297a

A long ballistic supermirror guide for cold neutrons at the ILL

H. Häse, A. Knöpfler, K. Fiederer, U. Schmidt, D. Dubbers, W. Kaiser

Nucl. Instr. Meth. 485, 453 (2002)

doi:10.1016/S0168-9002(01)02105-2

Submillimeter Test of the Gravitational Inverse-Square Law

C. D. Hoyle, U. Schmidt, B. R. Heckel, E. G. Adelberger, J. H. Gundlach, D. J. Kapner, H. E. Swanson

Phys. Rev. Lett. 86, 1418-1421 (2001)

doi:10.1103/PhysRevLett.86.1418

Neutron polarisation induced by radio frequency radiation

U. Schmidt, H. Abele, A. Boucher, P. Geltenbort, M. Klein, C. Stellmach

Phys. Rev. Lett. 84, 3270 (2000)

doi:10.1103/PhysRevLett.84.3270