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Rob Robinson & Trevor Finlayson

To cite this article: Rob Robinson & Trevor Finlayson (2022) Anthony (Tony) George Klein (1935–2021), *Neutron News*, 33:2, 19-19, DOI: [10.1080/10448632.2022.2038956](https://doi.org/10.1080/10448632.2022.2038956)

To link to this article: <https://doi.org/10.1080/10448632.2022.2038956>



Published online: 24 Feb 2022.



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Anthony (Tony) George Klein (1935–2021)

Tony Klein, who is well-known for a series of fundamental neutron physics experiments passed away on November 18, 2021, at his home in Melbourne, Australia.

Tony was born in Timisoara, Romania, in 1935 to a Jewish family with Hungarian citizenship, which they lost at the end of the Second World War. They migrated first to Israel, and then to Australia, where Tony spent the rest of his life. He originally studied electrical engineering at the University of Melbourne, followed by seven years at Lucas Heights with the Australian Atomic Energy Commission, working on controls for the HIFAR Reactor. He also spent a significant amount of time at both Argonne and Oak Ridge National Laboratories, and eventually went back to Melbourne to the School of Physics there. He was Head of the School for nine years between 1987 and 1996, making many important new hires and redirecting its research focus from nuclear physics and electron diffraction, into a more diversified and balanced portfolio of activities.

Tony's personal research was mainly in neutron optics and in neutron demonstrations of quantum mechanical effects. Perhaps his most celebrated work is that concerned with the fermion properties of the neutron, documented in two publications: *Observability of 2π Rotations: A Proposed Experiment*, A.G. Klein and G.I. Opat, *Phys. Rev. D* **11**, 523-8 (1975); and *Observation of 2π Rotations by Fresnel Diffraction of Neutrons*, A.G. Klein and G.I. Opat, *Phys. Rev. Lett.* **37**, 238-40 (1976).



Tony Klein (right) and Geoff Opat discussing their famous 2π rotation experiment in the School of Physics at The University of Melbourne. Acknowledgement to Norman Wodetzki for permission to reproduce the photograph (reference number 2003.0003.00100 in The University of Melbourne Archives.)

Tony initially started his career at the HIFAR reactor, but then did most of his important experiments at the Institut Laue-Langevin in Grenoble. While he mostly collaborated with his friend Geoff Opat, he also enjoyed a collaboration with Professor Sam Werner (University of Missouri) with whom he published an extensive review in 1983.

When the Australian Government decided in 1997 to build a replacement reactor (for HIFAR), now known as OPAL, Tony joined a committee to select the initial eight neutron instruments and the beam facilities included within the scope of the project. When the contract to build OPAL was signed in June 2000, Tony was asked to chair a slimmed-down and internationalized committee to advise the project. He did this with aplomb, until project completion in 2007. One of his legacies is the office building (B87) for staff and users, and a rich array of witty anecdotes and aphorisms. One of

our favorites, regarding the Replacement Reactor Project is “*ANBUG (the Australian Neutron Beam Users Group) was flogging a dead horse, and then, Lo and Behold, the horse got up and started running again!*”

For many years he was a member of a group of mainly retired but still research-active academics of the University, known as “The Water Table”, who would meet for lunch every Friday in University House, to discuss various topics to which Tony would regularly make a learned contribution. Two such topics which come to mind were discussions of the neutron lifetime which remains a topic in the current literature, and the sad issue of whale stranding, the most recent disaster for hundreds of pilot whales having been in Macquarie Harbour in Tasmania in 2020.

In 2017, Tony was honored for his overall contributions to the life of the University, with a University of Melbourne Award. The resultant bronze plaque, set into the bricks along Professors' Walk leading to University House, reads “*Eminent researcher in physics – Inspirational lecturer – Highly regarded leader and mentor.*”

Thank you, Tony, for all the memories and all that you did for us.

ROB ROBINSON
University of Wollongong,
Wollongong, Australia

TREVOR FINLAYSON
University of Melbourne,
Melbourne, Australia