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The Pulsed Low-Energy Positron System PLEPS: Recent Developments

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The Pulsed Low-Energy Positron System PLEPS [1] is a user facility for defect depth-profiling by means of positron lifetime measurements with a monochromatic pulsed positron beam of variable energy ranging from 0.5-21 keV at the intense positron source NEPOMUC at the MLZ in Garching [2].

To further extend the scope of defect characterization of PLEPS various possibilities of in-situ manipulation of the sample during lifetime measurements have been implemented: To drift positrons to layers, interfaces and surfaces it is now possible to apply electrical fields to the sample. A wave-length selective broadband illumination system was installed to manipulate the charge-state of optically active defects. Also, the sample temperature may be varied between 80 K and 600 K. The data-acquisition system was updated to match recent advances at the NEPOMUC remoderator [3]. Moreover, numerical simulations of crucial pulsing components have been conducted to further improve the performance of PLEPS.

[1] W. Egger, Proc. Int. School Phys. "E. Fermi", CLXXIV (eds. A. Dupasquier and A. P. Mills jr.), IOS Press: Amsterdam, 419 (2010).

[2] Ch. Hugenschmidt, JLSRF 1 (2015) A 22

[3] M. Dickmann, Acta Phys Pol A 137 (2020) 149

Author: HELM, Ricardo (Universität der Bundeswehr München)

Co-authors: EGGER, Werner (Universität der Bundeswehr München); DICKMANN, Marcel; MITTENEDER, Johannes (Universität der Bundeswehr); Dr KÖGEL, Gottfried (Universität der Bundeswehr München); Dr SPERR, Peter (Universität der Bundeswehr München); DOLLINGER, Günther

Presenter: HELM, Ricardo (Universität der Bundeswehr München)

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