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LIMPID Applied to DBS Measurements on Multilayer Systems

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LIMPID (Layer-wise Investigation of Measurements on Positron Implantation and Diffusion) is a new analysis tool for positron depth profiles generated by variable energy Doppler-broadening spectroscopy. It allows the user to extract positron diffusion lengths by fitting the measured lineshape parameters as a function of implantation energy. The code is written in Python and open source, thereby easily accessible and adaptable. In this talk we present the theoretical background of the algorithm implemented, which includes a solution of the time-independent positron diffusion equation. By taking into account sample properties such as mass density and composition, LIMPID can be used to determine other sample parameters like, e.g., layer thicknesses in multilayer systems. We demonstrate the main features of LIMPID using measurement data obtained from Cu/Cr bilayers on a Si substrate. Furthermore we discuss the performance of the code and compare it to VEFFIT, the current, albeit outdated, standard software.

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