

Surface residual stress profiles by neutrons-treatment of spatial resolution effects and spurious strains

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A method for near surface strain scanning measurements using neutron diffraction with large gauge volumes is described and validated against x-ray diffraction (XRD) and neutron diffraction experiments with very high spatial resolution. The approach corrects for pseudo strains related to partially buried gauge volumes and enables to deconvolute the averaging effects associated with the use of a large gauge volume. The results show that neutron diffraction based strain measurements with standard sized gauge volumes are possible. Compared to measurements with smaller gauge volumes gains in counting time of up to a factor of fifteen can be achieved without appreciable loss in spatial resolution.

Primary authors: Dr REBELO KORNMEIER, Joana; Dr HOFMANN, Michael; Dr LUZIN, Vladimir (ANSTO, ACNS,); SAROUN, Jan (Nuclear Physics Institute of the CAS); Dr GIBMEIER, Jens (Karlsruhe Institute of Technology (KIT), Institute of Applied Materials (IAM))

Presenter: Dr REBELO KORNMEIER, Joana

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