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Neutron Depth Profiling with Highest Luminosity Pulsed Beams

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One major limitation in neutron depth profiling is given by the signal to background ratio (S/B) especially using thick sample material or samples with high amount of absorbing elements. A high neutron flux for fast and time resolved measurements introduces typically a fast increase of beta activity in the sample material and dilutes the S/B ratio. Shielding techniques for beta particles and delayed gamma rays cannot be applied in NDP . Also the detector active volumes have already reached physical limitations. The most promising way out is a direct correlation of impinging neutron with particle emission after the absorption. A major step toward such a scheme is provided by the use of pulsed neutron beams. With a beam duty cycle of 4% for example at the ESS we expect the random background being suppressed by at least one order of magnitude. This would especially allow us to study material compositions with heavy absorbing elements as metals or strongly activating components and opens up a complete new measurement scheme in NDP. First ideas and necessary conditions will be presented in this contribution.

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