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Instrumentation for compact High Brilliance Neutron Sources

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The High Brilliance Neutron Source (HBS) concept [1,2] offers the optimization of the neutron spectrum and the time structure of the neutron pulse for the individual beam ports due to specific moderator configurations and dedicated target stations with suitable pulse structure. The HBS principle is scalable and can be realized at different power levels with well adapted instruments.

In this presentation, we present some workhorse instrument concepts for neutron scattering as well as neutron analytics that can be realized at a low-power, university size neutron source of the NOVA ERA type [2]. In addition, we present a suite of instrumentation for elastic and inelastic neutron scattering and neutron analytics that can be realised at a high-power HBS source [1] that is scientifically competitive with the instrumentation at today's medium flux research reactors.

We show instrument layout concepts together with flux and detector intensity calculations based on the moderator calculations for the neutron sources of the NOVA ERA and the high-power HBS type.

[1] U. Rücker et al., The Jülich high-brilliance neutron source project, Eur. Phys. J. Plus (2016) 131: 19. https://doi.org/10.1140/epjp/i2016-16019-5

[2] E. Mauerhofer et al., Conceptual Design Report NOVA ERA (Neutrons Obtained Via Accelerator for Education and Research Activities) A Jülich High Brilliance Neutron Source project, Schriften des Forschungszentrums Jülich, General, Volume 7, ISBN 978-3-95806-280-1 (2017) http://hdl.handle.net/2128/16404

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