Title of the Abstract: Rebuilding POWGEN: World’s only third generation TOF powder diffractometer

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POWGEN is a fundamental departure from previous designs for a time-of-flight powder diffractometer at a spallation neutron source and may be considered a third-generation design. The instrument is optimized for both parametric studies of materials under a wide range of conditions (T, P, H, flowing gases, etc) and ab-initio crystal structure determinations of complex solid-state materials with asymmetric unit-cells of the order ~1500 Å³. The geometric design of the instrument allows for all detected scattered neutrons to be focused onto a single diffraction profile yielding high count rate while preserving good resolution ∆d/d = 0.0015 at d = 1 Å. This instrument was recently rebuilt to increase detector coverage and extend the coverage in q, while keeping the original 3rd generation design philosophy in place. In this presentation I will discuss the design and its effects on the standard operation of this instrument and show a few examples of science case how it can be used effectively.

Keywords: neutron diffraction, powder diffraction, Spallation Neutron Source