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C2Po2B-08: Cryostat for arbitrary ortho-parahydrogen reference mixtures

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Some applications in liquid hydrogen (LH2) research require the availability of hydrogen with a freely adjustable ortho-para ratio. Examples of this are the calibration and qualification of ortho-parahydrogen measurement systems, the establishment of defined arbitrary inlet compositions for sample reactors investigating the performance of ortho-para catalysts, and investigation on the neutron scattering cross section in LH2-based cryogenic neutron moderators.
In this work, a cryostat for the production of stable, arbitrarily adjustable ortho-parahydrogen mixtures is presented. It is part of a new facility at TU Dresden focused on the comprehensive investigation of catalytic ortho-parahydrogen conversion established within the government-funded project HyCat. The system uses a strongly oversized isothermal catalyst bed to ensure full conversion of a continuous hydrogen flow to the equilibrium condition for temperatures between 18 and 100 K and pressures between about 2 bar(a) and 100 bar(a). First experiences with the use of the cryostat were made and operational limits have been demonstrated.

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