

Technical Meeting on Plasma Physics and Technology Aspects of the Tritium Fuel Cycle for Fusion Energy

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Neutral beams and the requirements they place on the fuel cycle

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Present and planned fusion machines rely heavily on the use of neutral beam injectors, to provide plasma heating and current drive. In the case of large experiment, like ITER and beyond, the atoms injected in the plasma require a high energy (>500 keV) to penetrate the dense and large plasma and deliver the power at plasma center. This calls for the use of negative ions as precursors of the atomic beam. Negative ions are typically created in a cold plasma ion source, by a complex interplay of physicochemical processes requiring a careful control of the main parameters, including the source pressure and gas purity.

This contribution summarizes the basic concept of the neutral beam injection systems, focusing on the needs for high purity of the gas that in turns sets a demanding requirement to the fueling system. The reasons behind the definition of the specific values in the case of ITER NBIs are discussed and the consequences of a deviation from prescribed values are addressed.

The views and opinions expressed herein do not necessarily reflect those of the ITER Organization

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