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Spectroscopic diagnostics for negative ion source test facility at ASIPP

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In order to support the development of the negative ion based neutral beam injection system for next generation fusion experimental reactor, a negative ion source test facility with radio frequency source is being built at Institute of Plasma Physics, Chinese Academy of Sciences (ASIPP). A full set of spectroscopic diagnostics was designed to meet the requirement of operation performance optimization. This paper describes the design of optical emission spectroscopy of the plasma source and negative ion absorption spectroscopy. Ion formation and recombination processes are accompanied by radiation of different characteristic spectral lines, the Balmer series and Cs line at 852.1nm. By measuring the intensity of spectral lines, the key parameters, such as temperature and density of electron and cesium quantity, will be estimated. Absorption spectroscopy, with a cavity ring-down technique, will provide a direct measure of the negative ion density. These diagnostics will provide strong support for the coupling of RF power and improvement of negative ion density.

Eligible for student paper award?

No

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