



The banner features a circular portrait of Tobias Jesche on the left. The background is a close-up of a metallic, toroidal component, likely from the Wendelstein 7-X stellarator. In the top right corner, the 'FUSION Cohort 2017' logo is displayed. The title and synopsis are centered in white text. A Zoom logo and the meeting URL are in the bottom left.

Tobias Jesche - University of Stuttgart and IPP Garching

Effect of fast-ion losses on the plasma facing components of Wendelstein 7-X

Synopsis: In the Stellarator W7-X, the neutral beam injection causes the loss of fast-ions on the wall. The direct consequences for the wall components are sputtering and heating. Both processes were investigated on the basis of previous simulations and possible diagnostic methods were investigated, which could be used to detect wall damage at an early stage. The focus was mainly on stainless steel wall panels. With the help of a finite element analysis, the resulting surface temperatures were determined taking into account heat radiation, evaporation, heat conduction and water cooling for heat flows of various intensities and durations. Accordingly limits of the pulse duration were determined, which are subjected to the panel specifications. A selfactivating shutdown system due to excessive particle flow caused by evaporation before melting could not be found.

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Title: Effect of fast ion losses on the plasma facing components of W7X

Speaker: Tobias Jesche (MSc candidate, Stuttgart University, Germany)

When: 2019-01-24 20:00:00

Abstract: In the Stellarator W7-X, the neutral beam injection causes the loss of fast-ions on the wall. The direct consequences for the wall components are sputtering and heating. Both processes were investigated on the basis of previous simulations and possible diagnostic methods were investigated, which could be used to detect wall damage at an early stage. The focus was mainly on stainless steel wall panels. With the help of a finite element analysis, the resulting surface temperatures were determined taking into account heat radiation, evaporation, heat conduction and water cooling for heat flows of various intensities and duration. Accordingly limits of the pulse duration were determined, which are subjected to the panel specifications. A self-activating shutdown system due to excessive particle flow caused by evaporation before melting could not be found.

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