Contribution ID: **108** Type: **Poster Presentation**

New Sorgentina Fusion Source (NSFS) Experimental Facility Supporting Materials Research

Tuesday, 20 May 2014 17:30 (1h 30m)

Within the framework of fusion technology research and development, a neutron source has long been considered a key facility to perform irradiation tests aiming at populating materials engineering database – supporting DEMO reactor design and licensing. New Sorgentina Fusion Source (NSFS) has been proposed taking advantage of well-established D-T neutron generators technology, properly scaled in order to attain a bright source of some 1015 n/sec - with an actual 14 MeV neutron spectrum as relevant feature. Ion beams of 30 A are produced and accelerated up to some 200 keV energy. Present design envisages ion generators and extraction grid technology employed in neutral injectors currently utilized at large experimental tokamaks. Then deuterium and tritium ion beams are delivered to the target impinging on a hydride thin layer which is on-line D-T reloaded. Metal hydride is continuously re-deposited preventing layer from being sputtered and increasing installation load factor. Large and fast rotating target is conceived to enhance heat removal - coping with thermal transients and mechanical loads. Design features achieve high performances withstanding elevated heat flux of some tens kW/cm2 and significant thermal fatigue concerns. Main facility characteristics are provided, as well as target thermal and mechanical issues.

Summary

Fusion spectrum relevant neutron source is perceived as major facility within the framework of R&D supporting DEMO reactor. Proven technology solution for bright neutron source is presented, utilizing scaled D-T neutron generators together with accelerators used in neutral injector systems at large tokamaks. High power density issues in rotating target design are presented as far as fast thermal transients are concerned and related thermal fatigue issues.

Primary author: Mr CONSOLE CAMPRINI, Patrizio (ENEA National Agency for New Technologies, Energy and Sustainable Economic Development)

Co-authors: Dr BERNARDI, Davide (ENEA); Mrs FRISONI, Manuela (ENEA National Agency for New Technologies, Energy and Sustainable Economic Development); Mr PILLON, Mario (ENEA National Agency for New Technologies, Energy and Sustainable Economic Development)

Presenter: Mr CONSOLE CAMPRINI, Patrizio (ENEA National Agency for New Technologies, Energy and Sustainable Economic Development)

Session Classification: HPTW Poster Session & Reception

Track Classification: Target Facility Challenges