Contribution ID: **17** Type: **Poster**

Current Status and Perspectives on Demo WCLL BB Design Activities

In the general framework of the R&D activities supported by the EUROfusion consortium, the development and qualification of the Breeding Blanket (BB) is seen as a mandatory step in the demonstration and deployment of fusion reactors as a successful energy source. The optimal solution for an early BB concept ought to demonstrate the possibility to reach the fuel self-sufficiency, effectively evacuate the thermal power generated inside the reactor, and have a reasonable availability. These goals are expected to be achieved in a technological demonstrator, such as EU-DEMO, and one of the best candidates to achieve this goal is the Water-Cooled Lead Lithium (WCLL). This BB concept relies on water at PWR conditions as cooling fluid, Lead lithium eutectic alloy (PbLi) as tritium breeder & carrier, and the reduced-activation ferritic–martensitic steel Eurofer as structural material.
The present paper would like to give a wide overview on the analytical, numerical and experimental activities performed and the results achieved so far by the European researchers involved in the development of this BB concept in the framework of the Breeding Blanket Work Package. The paper describes the WCLL BB reference geometry, the thermal-hydraulic, thermomechanical, magneto-hydrodynamic, structural, neutronic, tritium transport and retention activities. A section is also dedicated to the experimental studies regarding water chemistry, water CHF experiments, MHD experiments, PbLi-water interaction and breeding unit manufacturing.

Speaker's title

Mr

Speaker's email address

ranieri.marinari@enea.it

Country/Int. organization

Italy

Affiliation/Organization

ENEA

Author: MARINARI, Ranieri (ENEA Brasimone Research Centre)

Co-authors: Dr COLLAKU, Aldo (Politecnico Torino); Dr TASSONE, Alessandro (Università Roma -La Sapienza-); Dr VENTURINI, Alessandro (ENEA); Dr FROIO, Antonio (Politecnico Torino); Dr SARTORIO, Camillo (ENEA); Dr MISTRANGELO, Chiara (KIT); Dr MARINO, Corrado (Politecnico Torino); Dr CIURLUINI, Cristiano (Università Roma - La Sapienza-); Dr PIOZIN, Emma (CEA); Dr GIANNETTI, Fabio (Università Roma - La Sapienza-); Dr MORO, Fabio (ENEA); Dr ROCA URGORRI, Fernando (CIEMAT); Dr CASTROVINCI, Francesca Maria (ENEA); Dr GALLENI, Francesco (Università Pisa); HERNANDEZ GONZALEZ, Francisco (Karlsruhe Institute of

Technology); Dr CATANZARO, Ilenia (Università Palermo); Dr AKTAA, Jarir (KIT); Dr TOSI, Jerome (CEA); Dr BUHLER, Leo (KIT); Dr MISSIRLIAN, Marc (CEA); Dr EBOLI, Marica (ENEA, Department of Nuclear Fusion and Safety, C.R. Brasimone, Camugnano, Italy); Dr ARENA, Pietro (ENEA, Department of Nuclear Fusion and Safety, C.R. Brasimone, Camugnano, Italy); Dr MACCARI, Pietro (ENEA); Dr TORELLA, Raffaele (CONSORZIO RINA-CSM); Dr POMELLA LOBO, Thiago (KIT); Dr IMBRIANI, Vito (CONSORZIO CREATE)

Presenter: MARINARI, Ranieri (ENEA Brasimone Research Centre)

Session Classification: Topics I, II, III Posters

Track Classification: Track I: Breeding blanket design and performance