



Contribution ID: 82

Type: **not specified**

Structural integrity assessment of an ITER ECH&CD Upper Launcher mirror (LM1)

Monday, 17 September 2018 11:00 (2 hours)

The Lower Mirror one (LM1) is part of the in-vessel quasi-optical beam propagation system for the ITER Electron Cyclotron (EC) Upper Launcher (UL), in which each of eight beams of mm-waves are reflected from four mirrors during passage to the plasma. 60000 thermal cycles are foreseen at frequencies lower than 3Hz and power levels up to 1.31MW per beam.

This paper reports the means used to accurately ascertain resistance against the following failure modes: 1) plastic collapse, 2) thermal fatigue and 3) ratcheting. Analyses are carried out in accordance with the design-by-analysis approach. Transient thermo-mechanical effects are investigated via finite elements to support the assessment during the thermal cycle.

This structural integrity study of the LM1 mirror using the American code and standards for pressure vessels and piping aims to confirm the compliance of the proposed design.

This work was supported in part by the Swiss National Science Foundation.

This work was carried out within the framework of the ECHUL consortium, partially supported by the F4E grant F4E-GRT-615. The views and opinions expressed herein do not necessarily reflect those of the European Commission or the ITER Organization.

Keywords: LM1, Upper Launcher, Transient Thermo-Mechanical Analysis, Structural Integrity, Fatigue

Co-authors: Dr VAGNONI, Matteo (Swiss Plasma Center, École polytechnique fédérale de Lausanne); Dr CHAVAN, René (EPFL); Dr GAGLIARDI, Mario (Fusion for Energy); Dr GOODMAN, Timothy (EPFL); Dr MAS SÁNCHEZ, Avelino (EPFL); Dr SANTOS SILVA, Philip (EPFL)

Presenter: Dr VAGNONI, Matteo (Swiss Plasma Center, École polytechnique fédérale de Lausanne)

Session Classification: P1

Track Classification: Plasma Heating and Current Drive