Contribution ID: **65** Type: **Poster**

EX/P8-03: Density Limit Experiments on FTU

Friday, 12 October 2012 14:00 (4h 45m)

One of the main problems in tokamak fusion devices concerns the capability to operate at high plasma density, that is observed to be limited by the appearance of catastrophic events causing loss of plasma confinement. The commonly used empirical scaling law for the density limit is the Greenwald limit, predicting that the maximum achievable line averaged density along a central chord depends only on the average plasma current. The aim of this work is to present the results of dedicated density limit experiments performed on the Frascati Tokamak Upgrade (FTU) in which the high density domain was explored in a wide range of values of plasma current (I = 500 - 900 kA) and toroidal magnetic field (B = 4 - 8 T). These experiments confirm the edge nature of the density limit as a Geenwald like scaling holds for the maximum achievable line averaged density along a peripheral chord. However, when the central line-averaged is considered, the dependence of the density peaking on the edge safety factor, associated to the presence of MARFEs, give rise to a new density limit scaling law in which the central line-averaged density is solely dependent on the toroidal magnetic field. The behaviour of the density limit with the magnetic field in presence of pellet injection and with strong lithium coated wall will be studied in FTU in the next future, possibly including lower magnetic field discharges.

Country or International Organization of Primary Author

Italy

Primary author: Mr PUCELLA, Gianluca (Italy)

Co-authors: Ms ROMANO, Afra (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr TUCCILLO, Angelo Antonio (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr BOTRUGNO, Antonio (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr ESPOSITO, Basilio (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr CASTALDO, Carmine (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr CIANFARANI, Cesidio (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Ms MAZZOTTA, Cristina (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr MAROCCO, Daniele (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr FRIGIONE, Domenico (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr GIOVANNOZZI, Edmondo (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr MARTINES, Emilio (Consorzio RFX, Assoc. Euratom-ENEA, Corso Stati Uniti 4, I-35127 Padova, Italy); Mr BELLI, Francesco (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Ms APRUZZESE, Gerarda (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr ARTASERSE, Giovanni (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr CALABRÒ, Giuseppe (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr MAZZITELLI, Giuseppe (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr RAMOGIDA, Giuseppe (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr GRANUCCI, Gustavo (IFP-CNR, Assoc. Euratom-ENEA, Via R. Cozzi 53, I-20125 Milano, Italy); Mr ZENG, Long (Institute of Plasma Physics, Chinese Academy of Sciences, Hefei, 230031, P. R. China); Ms GABELLIERI, Lori (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr BONCAGNI, Luca (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi

45, I-00044 Frascati, Italy); Ms DIMATTEO, Lucy (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Ms APICELLA, Maria Laura (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr MARINUCCI, Massimo (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr ZUIN, Matteo (Consorzio RFX, Assoc. Euratom-ENEA, Corso Stati Uniti 4, I-35127 Padova, Italy); Mr TUDISCO, Onofrio (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr BURATTI, Paolo (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Ms NOWAK, Silvana (IFP-CNR, Assoc. Euratom-ENEA, Via R. Cozzi 53, I-20125 Milano, Italy); Mr COCILOVO, Valter (C.R. ENEA, Assoc. Euratom-ENEA, Via E. Fermi 45, I-00044 Frascati, Italy); Mr BIN, William (IFP-CNR, Assoc. Euratom-ENEA, Via R. Cozzi 53, I-20125 Milano, Italy)

Presenter: Mr PUCELLA, Gianluca (Italy)

Session Classification: Poster: P8

Track Classification: EXS - Magnetic Confinement Experiments: Stability