Collective Thomson scattering measurements of fast-ion transport due to sawtooth crashes in ASDEX Upgrade - DTU Orbit (22/12/2018)

Collective Thomson scattering measurements of fast-ion transport due to sawtooth crashes in ASDEX Upgrade

Sawtooth instabilities can modify heating and current-drive profiles and potentially increase fast-ion losses. Understanding how sawteeth redistribute fast ions as a function of sawtooth parameters and of fast-ion energy and pitch is hence a subject of particular interest for future fusion devices. Here we present the first collective Thomson scattering (CTS) measurements of sawtooth-induced redistribution of fast ions at ASDEX Upgrade. These also represent the first localized fast-ion measurements on the high-field side of this device. The results indicate fast-ion losses in the phase-space measurement volume of about 50% across sawtooth crashes, in good agreement with values predicted with the Kadomtsev sawtooth model implemented in TRANSP and with the sawtooth model in the EBdyna_go code. In contrast to the case of sawteeth, we observe no fast-ion redistribution in the presence of fishbone modes. We highlight how CTS measurements can discriminate between different sawtooth models, in particular when aided by multi-diagnostic velocity-space tomography, and briefly discuss our results in light of existing measurements from other fast-ion diagnostics.

General information
State: Published
Organisations: Department of Physics, Plasma Physics and Fusion Energy, University of Seville, Max-Planck-Institut fur Plasmaphysik, FOM Dutch Institute for Fundamental Energy Research, Budapest University of Technology and Economics
Number of pages: 9
Pages: 112014
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Nuclear Fusion
Volume: 56
Issue number: 11
ISSN (Print): 0029-5515
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.13 SJR 0.759 SNIP 1.424
Web of Science (2017): Impact factor 4.057
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.62 SJR 1.284 SNIP 1.416
Web of Science (2016): Impact factor 3.307
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.88 SJR 1.51 SNIP 1.62
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.2 SJR 1.907 SNIP 1.667
Web of Science (2014): Impact factor 3.062
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 1.83 SJR 1.366 SNIP 1.516
Web of Science (2013): Impact factor 3.243
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 1.81 SJR 1.441 SNIP 1.448
Web of Science (2012): Impact factor 2.734
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 3.78 SJR 2.043 SNIP 2.433
Web of Science (2011): Impact factor 4.09
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.268 SNIP 1.927
Web of Science (2010): Impact factor 3.03
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.993 SNIP 2.441
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 2.031 SNIP 1.736
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.005 SNIP 1.987
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 2.062 SNIP 1.937
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.885 SNIP 1.932
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.647 SNIP 1.673
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 2.215 SNIP 1.673
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 3.275 SNIP 1.409
Scopus rating (2001): SJR 2.159 SNIP 2.173
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.843 SNIP 1.104
Scopus rating (1999): SJR 1.99 SNIP 1.496
Original language: English
Keywords: Fast ions in tokamaks, Collective Thomson scattering, Fast-ion velocity distribution function, Sawtooth instabilities
Electronic versions: WPMST1PR1614817.pdf. Embargo ended: 22/07/2017
DOIs: 10.1088/0029-5515/56/11/112014
Source: FindIt
Source-ID: 277757054
Research output: Research - peer-review › Journal article – Annual report year: 2016