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**Statistical physics of inter-ELM time interval sequences** ANTHONY WEBSTER, RICHARD DENDY, Culham Centre for Fusion Energy, SANDRA CHAPMAN, Warwick University, JET-EFDA TEAM — We report recent studies of the statistical properties of the sequence of time intervals between successive edge localised modes (ELMs). We have compared theoretically derived and empirical probability density functions (pdfs) for the waiting time intervals between ELMs from 85 long steady H-mode plasmas from the Joint European Torus (JET). The Weibull distribution provides a good fit to both type I and type III ELMs, with different parameters. We infer (A J Webster and R O Dendy, Phys Rev Lett 110, 155004 (2013)) that the type III ELMs were generated by a memoryless process, whereas the type I ELMs were consistent with build-up and release. Delay time analysis (F A Calderon, R O Dendy, S C Chapman, A J Webster et al, Phys. Plasmas 20, 042306 (2013)) of six similar JET H-mode plasmas with different levels of gas puffing strongly suggests that the underlying ELMing process is low dimensional. A current study of a dataset of 15,000 ELMs from two weeks of equivalent JET plasmas yields a combined pdf for inter-ELM time intervals which, surprisingly, displays a series of sharp maxima. All three studies show that rigorous statistical analysis of inter-ELM time intervals can contribute to quantitative classification of ELM types and to physical insight into the ELMing processes.

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