Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Theoretical model of "fuzz" growth[1] SERGEI KRASHENINNIKOV, ROMAN SMIRNOV, UCSD — Recent more detailed experiments on tungsten irradiation with low energy helium plasma, relevant to the near-wall plasma conditions in magnetic fusion reactor like ITER, demonstrated (e.g. see Ref. 1) a very dramatic change in both surface morphology and near surface material structure of the samples. In particular, it was shown that a long (mm-scale) and thin (nm-scale) fiber-like structures filled with nano-bubbles, so-called "fuzz," start to grow. In this work theoretical model of "fuzz" growth [2] describing the main features observed in experiments is presented. This model, based on the assumption of enhancement of creep of tungsten containing significant fraction of helium atoms and clusters. The results of the MD simulations [3] support this idea and demonstrate a strong reduction of the yield strength for all temperature range. They also show that the "flow" of tungsten strongly facilitates coagulation of helium clusters and the formation of nano-bubbles.

[1] M. J. Baldwin, et al., J. Nucl. Mater. **390-391** (2009) 885;
[2] S. I. Krasheninnikov, Physica Scripta **T145** (2011) 014040;
[3] R. D. Smirnov and S. I. Krasheninnikov, submitted to J. Nucl. Materials.

[1]Work was performed under the auspices of USDOE Grant No. DE-FG02-04ER54739 and the PSI Science Center Grant DE-SC0001999 at UCSD.

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Date submitted: 16 Jul 2012 Electronic form version 1.4