Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

**Graphene's Viability for Fusion Applications**[1] MARCOS NAVARRO, KARLA HALL, RICHARD ROJAS, JOHN SANTARIUS, GERALD KULCINSKI, Univ of Wisconsin, Madison — Graphene is a source of interest for multiple applications due to its unusual electronic and physical properties. As a coating material, it has reduced oxidation of the main substrate, though no effort has been reported of testing it under fusion conditions. A number of experimental studies have established that defect-free graphene is an excellent barrier material for gases. We explore its viability to maintain a significant pressure difference under ion irradiation. Deuterium is used as a projectile on graphene coated silicon over a range of 10-50 keV energies and various fluences. The vacancy yield (amount of damage) and natural resonance for graphene are found at around 1350 $cm^{-1}$ and 1550 $cm^{-1}$, respectively. Damage of each sample is quantified via Raman spectroscopy (RS) using the ratio of the intensities at these wavenumbers. Graphene is also tested here as a coating for some fusion components. Though tungsten is a very promising divertor and first wall candidate, after intense irradiation, it is prone to developing fuzz or grass structures, leading to a diminished lifetime. Graphene grown on tungsten is tested under reactor conditions with 30 keV He ions at several fluences, and the sputtering of both materials is studied via RS and Scanning Electron Microscopy.

[1]This work was supported by the Graduate Engineering Research Scholars and the TEAM-Science program at the University of Wisconsin-Madison.

Marcos Navarro
Univ of Wisconsin, Madison

Date submitted: 23 Jul 2015 Electronic form version 1.4