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**Growth of $\beta$-Tungsten Films Towards a Giant Spin Hall Effect Logic Device** AVYAYA JAYANTHINARASIMHAM, MANASA MEDIKONDA, AKITOMO MATSUBAYASHI, WESTLY NOLTING, ALAIN DIEBOLD, VINCENT LABELLA, State university at Albany, College of Nanoscale Science and Engineering — Spin orbit interaction in a semiconductor and metal result in spin current transverse to a charge current, this is spin Hall effect. It was theoretically predicted by Dyakonov. et. al and J.E.Hirsch, but not until it was experimentally confirmed in 2004 by Kato, Y.K. *et al.* did it attract the much attention. Recent spin Hall effect studies in metals like $\beta$-Ta, $\beta$-W produce spin currents strong enough to switch an adjacent magnetic layer. $\alpha$ and $\beta$ phases of Tungsten are strongly governed by film resistance, thickness, base pressure and oxygen availability. The metastable $\beta$-W is known to exhibit giant spin Hall effect. Deposition conditions selective to $\beta$ phase should be used to fabricate these devices. A step wise process flow for a fully functioning device that combines the giant spin Hall effect and magnetic tunnel junction needs to be explored. This poster will present our work on fabricating and characterizing thicker tungsten films, dominated with $\beta$-phase, towards a giant spin Hall Effect structures utilizing the 300 mm wafer processing facilities at CNSE.

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