Atomic Scale Processing Lab @ ANL

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Albanova Nanolab (ANL, www.albanova-nanolab.org) hosts many research projects critically dependent on high-quality ultrathin films and multilayers – superconducting single-photon detectors, quantum-limited AFM sensors, synthetic antiferromagnets for magnetocalorics, 2D quantum materials, multiferroics, surface catalysts including heterogeneous and single-atom catalysis, to name a few. For these applications ALD, ALE, and 2D material growth are key atomic scale processing techniques, where control at the atomic scale benefits from low-damage plasmas. Clustering unlocks additional processing options, such as integration of atomically engineered films or stacks produced by ALD into waveguides deposited by in-situ CVD (ideally low-temperature ICP-CVD; would be unique for KTH and regionally), for better interphases and eventually increased device efficiency. An ALD-CVD cluster complemented with an advanced fab-metrology tool capable at the atomic scale (near-atomic STEM, EDS, EBSD, etc.) would form the base for an Atomic Scale Processing lab at ANL, synergetic to our nano-scale e-beam and FIB-based materials and device processing, would be a regionally unique facility. It would contribute to sustainable development via R&D on future low-power/quantum electronics, photonics, smart/green materials, ultra-sensitive bio-molecular and bio-medical metrology, where we have a solid track record of spin-offs and start-ups.