Atomically precise devices: the challenge of nanofabrication

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Our research group is committed to applying the ideas of atomically perfect material synthesis to the resolution of real issues in many technological and industrial fields. Our method is not restricted to the creation of materials from the bottom up; it also requires a thorough comprehension of the atomic-scale interactions that regulate the behaviour of mesoscopically complex systems. One of our ongoing research projects investigates the viability of Ferromagnetic Insulators/Superconductor heterostructures as a novel platform for future quantum advancements.

To attain this objective, we must first control the structural, chemical, electrical, and magnetic properties of the layer-by-layer materials with extreme precision. Then, we use these materials to create devices and investigate the relationship between their properties and the mesoscopic response, such as transport and thermoelectricity. Specifically, we are examining heterostructures that combine thin layers of EuS in contact with Al, as well as evaluating the usage of all 2D devices that mix NbSe2 superconductors with 2D ferromagnetic insulators such as Transition metal dihalides.

References

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Figures

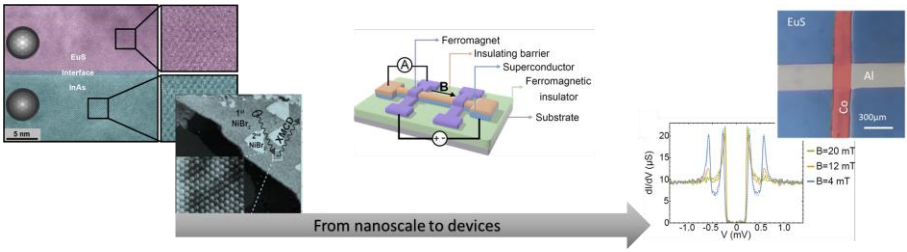

Figure 1: Schematic representation of fabrication of atomically precise devices.