## Shape-tuning quantum materials

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Materials with novel electronic properties are commonly studied in bulk crystal form, an ideal platform to uncover their thermodynamic ground state properties. Recent advances in crystal micromachining using Focused Ion Beams have demonstrated how reducing the size of 3D systems below relevant length scales of their physics can induce qualitatively new phenomena absent in bulk form. Key mechanisms are microscopic surface design, geometric frustration and dimensional reduction - phenomena well studied in 2D systems like thin-films or exfoliated vdW systems yet largely unexplored in 3D materials. I will review recent cases of shape tuning of quantum systems in Kagome superconductors[1], semi-metals at the quantum limit [2] and related quantum materials.

[1] C. Guo et al., Nature 647, 68-73 (2025).
[2] J. Seo et al., Nature Physics 22, 232-238 (2026).