Bismuth Films Deposited by Molecular Beam Epitaxy

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Abstract. Bismuth is a material with some interesting physical properties. It exhibits strong spin-orbit coupling and is also the basis of several topological insulators. The most important for applications is the (111) Bi surface. The aim of this work was to prepare Bi films on Si(111) substrates. We present a combination of substrate preparation technique and two-step deposition technique based on molecular beam epitaxy, which allowed us to achieve epitaxial growth of Bi. The final film exhibited a strong preferred orientation in the (111) direction confirmed by X-Ray diffraction and Reflection High Energy Electron Diffraction patterns and a smooth surface with low roughness confirmed by scanning electron microscopy.