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Pairing of the spirals on epitaxially grown Bi₂Se₃ on Si(111) YUXUAN CHEN, CHRISTOPHER MANN, CHIH-KANG SHIH, University of Texas at Austin — Bi₂Se₃ is a 3D topological insulator that exhibits backscattering suppression and helical Dirac-like Quasiparticles, making it an ideal candidate for topological physics research. Molecular beam epitaxy (MBE) can control the Se stoichiometry and vacancy density by controlling the Se overpressure during growth, thereby producing bulk insulators, allowing access to the novel physics promised by these systems. We have prepared Bi₂Se₃ thin films on Si(111) substrates by MBE. Atomic force microscopy and scanning tunneling microscopy topographies of these films often show large (100 to 500nm in diameter) triangular wedding-cake-shaped islands with spirals on top. More interestingly, the spirals often come in pairs of a clockwise and a counter-clockwise spiral. The high density of spiral pairs suggests that, such a surface structure is thermodynamically more favorable during the MBE. Our ongoing study of the very early stages of the MBE growth is unveiling more information of the spiral pairs. The knowledge of this growth mode will help us improve the sample quality.

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