Scanning tunneling spectroscopic (STS) studies of MBE-grown topological insulators of $\text{Bi}_2\text{Se}_3$ epitaxial films on $\text{Si}(111)$ N.-C. YEH, M.L. TEAGUE, W.-H. LIN, H. CHU, Dept. of Physics, Caltech, Pasadena, CA 91125, F.X. XIU, L. HE, K.L. WANG, UCLA, Los Angeles, CA 90095 — We report STS studies of MBE-grown $\text{Bi}_2\text{Se}_3$ epitaxial films on $\text{Si}(111)$ with varying thicknesses. The films were atomically flat on the scale of hundreds of nanometers, with occasional atomic steps of one $c$-axis lattice constant. In the case of thick $\text{Bi}_2\text{Se}_3$ films, the tunneling spectra were consistent with those found in single crystalline $\text{Bi}_2\text{Se}_3$, except that the Dirac point ($E_{\text{Dirac}} = -50 \sim -100$ meV) of the MBE-film is generally much closer to the Fermi level ($E = 0$), in contrast to the large downshift of $E_{\text{Dirac}}$ ($= -400 \sim -200$ meV) commonly found in single crystalline bulk grown $\text{Bi}_2\text{Se}_3$. The STS spectra of the thinner films deviate from those of the thicker samples, probably the result of strain. Fourier transformed (FT) STS data as a function of energy reveals several quasiparticle scattering interference wave-vectors that are consistent with the topologically protected surface states with chiral spin texture, although the overall FT-STS maps are simpler than those reported on the $\text{Bi}_{0.92}\text{Sb}_{0.08}(111)$ surface due to simpler electronic band-structures of $\text{Bi}_2\text{Se}_3$. The effect of time reversal symmetry breaking on the FT-STS will be investigated by either magnetic doping or application of magnetic fields. This work was supported by a grant from FENA of FCRP and DARPA.