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X-ray studies of the rotational fault distributions in multilayer graphene grown on the 4H-SiC$(000\bar{1})$ **surface** J.E. MILLÁN, J. HASS, Georgia Institute of Technology, F. VARCHON, Institut Neel/CNRS, W.A. DEHEER, C. BERGER, P.N. FIRST, Georgia Institute of Technology, L. MAGAUD, Institut Neel/CNRS, E.H. CONRAD, Georgia Institute of Technology — We present x-ray diffraction experiments showing that multilayer graphene grown on 4H-SiC $(000\bar{1})$ (C-face) consists of a high density of rotational stacking faults. The existence of these faults explains why multilayer graphene is electronically similar to an isolated graphene sheet.[1] The faults present themselves as graphite rods rotated through a series of commensurate graphene/SiC angles relative to the SiC rods and as rods shifted due to compressed graphene at the fault boundaries. By analyzing the intensity modulations of these different rods, it is possible to extract information on the distributions of these faults in the film. We will present results from calculations of different models for the fault distribution and compare them against x-ray data for graphene films of different thicknesses. [1] J. Hass, F.Varchon, J. E. Millan-Otoya, M. Sprinkle, W.A. de Heer, C. Berger, P.N. First, L. Magaud, E.H. Conrad (to be published) http://arxiv.org/abs/0706.2134

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