

Abstract Submitted  
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**On the Phase Shift of RHEED Intensity Oscillation during Homoepitaxy by MBE** B. SHIN, DEAS, Harvard Univ., J.P. LEONARD, Dept. Mat. Sci. & Eng., Univ. of Pittsburgh, J.W. MCCAMY, M.J. AZIZ, DEAS, Harvard Univ. — Despite the widespread usage of RHEED over many years, there still remain fundamental questions unanswered with regard to the interpretation of RHEED measurements. One of these issues is the phase shift of the RHEED intensity oscillations upon changing the incidence angle of electron beams. Therefore, we have conducted a systematic investigation of the phase shift of the RHEED intensity oscillations during homoepitaxy of Ge(001) by MBE for a wide range of diffraction conditions. Our results show that for small incidence angles with a beam azimuth several degrees away from crystallographic symmetry directions, the phase stays the same; it starts to shift once the (004) Kikuchi line appears in the RHEED pattern. Moreover, under some conditions we observe the oscillations from only the Kikuchi feature and not from the specular spot, and the oscillatory behavior of the Kikuchi feature is almost out of phase with that of the specular spot. All these results convincingly demonstrate that the phase shift is caused by the interference of the specular spot by the Kikuchi features. The lesson that can be learned from our study is that in order to use the RHEED specular intensity oscillation to learn about surface morphology, one must be extremely careful that the RHEED measurements be conducted under conditions where the influence of the Kikuchi features is minimal.

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