

## WOLF-VILLAIN MODEL WITH EHRLICH-SCHWOEBEL BARRIER

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**Abstract:** Wolf-Villain (WV) model is a simple model used to study molecular beam epitaxy (MBE) growth. In this model, an adatom is deposited at a randomly chosen site on a flat substrate. The adatom then diffuses instantaneously within a finite diffusion length  $l$ . In the WV model, the adatom tries to maximize its coordination number or its bondings. We study statistical properties of the morphology and interface width of thin films grown by this model. The morphology of the WV model is kinetically rough and the growth exponent is  $\beta \approx 0.375$ . Then we study the effect of a potential barrier on the WV model. The potential barrier we are interested here is known as the *Ehrlich-Schwoebel* (ES) barrier. The ES barrier is introduced as an additional barrier for adatom diffusion over a step edge from upper to lower terraces. We found that the morphology is rough with mound/pyramid type structure formation on the surface. The growth exponent increases in this situation, with the value of  $\beta$  approaches 0.5.

**Key Word:** MBE, Ehrlich-Schwoebel (ES) barrier