1067-74-1708 **Nicholas O. Kirby*** (nkirby@ms.uky.edu), 715 Patterson Office Tower, Lexington, KY 40506.
Stability of step dynamics in nanowire growth.

A quasistatic version of the Burton-Cabrera-Frank model governing the growth of a nanowire is given by

$$\begin{cases} \frac{1}{r}\partial_r\left(r\partial_r\rho\right)+4 &= 0 & \text{for } (0,r_1)\cup(r_1,r_2)\cup(r_2,1) \\ -\partial_r\rho|^{+}_{r=r_n} &= K_+(\rho|^{+}_{r=r_n}+\frac{\gamma}{r_n}) & \text{for } n=1,2 \\ \partial_r\rho|^{-}_{r=r_n} &= K_-(\rho|^{-}_{r=r_n}+\frac{\gamma}{r_n}) & \text{for } n=1,2 \\ \rho(0) &< \infty & \\ \partial_r\rho|^{+}_{r=1} &= 0 & \end{cases}$$

and

$$\dot{r}_n=\partial_r\rho|^{+}_{r=r_n}-\partial_r\rho|^{-}_{r=r_n},$$

where $K_\pm$ and γ are constants determined by the material and $0\le r_1\le r_2\le 1$. We are interested in whether certain step motions lead to step collisions (i.e., $r_1=r_2$), and will see that for any choice of material parameters, there is a non-trivial set U of initial step configurations which lead to step collisions. Finally, I will describe rigorously how the size of the set U depends on the attachment parameters $K_\pm$ and the line tension γ. (Received September 21, 2010)