1114-35-282   **Agnid Banerjee*** (`agnidban@gmail.com`) and **Nicola Garofalo**. *A parabolic analogue of the higher-order comparison theorem of De Silva and Savin.*

We show that the quotient of two caloric functions which vanish on a portion of the lateral boundary of a $H^{k+\alpha}$ domain is $H^{k+\alpha}$ up to the boundary for $k \geq 2$. In the case $k = 1$, we show that the quotient is in $H^{1+\alpha}$ if the domain is assumed to be space-time $C^{1,\alpha}$ regular. This can be thought of as a parabolic analogue of a recent important result of De Silva and Savin and we closely follow the ideas in that paper. Analogous results are not true at points on the parabolic boundary which are not on the lateral boundary, i.e., points which are at the corner and base of the parabolic boundary. Besides being an interesting regularity result in its own right, a direct application of such a result as well as its elliptic counterpart above implies C^∞ smoothness of a priori $C^{1,\alpha}$ free boundaries without the use of the hodograph transformation of Kinderlehrer-Nirenberg-Spruck. This is a joint work with Prof. Nicola Garofalo. (Received August 31, 2015)