Barcelona Analysis Seminar **2021–2022**

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Online streaming (Zoom). Click here to join.

Blow-ups of caloric measure and applications to two-phase problems

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Let Ω^+ and Ω^- be disjoint time-varying domains in $\mathbb{R}^n_x \times \mathbb{R}_t$, $n \geq 2$, and let $\omega^\pm$ denote their associated caloric measures. Under appropriate mild non-degeneracy and regularity hypotheses on $\Omega^\pm$, mutual absolute continuity of ω^+ and ω^- on $E \subset \partial\Omega^+ \cap \partial\Omega^- \cap \text{supp}(\omega^+)$ implies that the parabolic Hausdorff dimension of $\omega^+|_E$ is $n+1$ and the parabolic blow-ups of ω^+ at ω^+-a.e. point of E are equal to a constant multiple of the parabolic $(n+1)$-Hausdorff measure restricted to hyperplanes containing a line parallel to the time-axis.

This is a parabolic analogue of a result of Kenig, Preiss and Toro, and its proof involves a set of techniques based on parabolic tangent measures. These methods, which I am going to discuss in my talk, also have other geometric applications, amongst which a caloric version of a theorem of Tsirelson about triple-points.

This is a joint work with Mihalis Mourgoglou.