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On the density and the spectrum of minimal submanifolds in space forms

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Resumo

Let $\varphi : M^m \to N^n$ be a properly immersed minimal submanifold in an ambient space close, in a suitable sense, to the space form $\mathbb{N}^n_k$ of sectional curvature $-k \leq 0$. In this talk, I discuss the relationship between the spectrum of M and its density function

$$\Theta(r) = \frac{\mathrm{vol}(M \cap B^n_r)}{\mathrm{vol}(\mathbb{B}^m_r)},$$

where $B^n_r, \mathbb{B}^m_r$ are geodesic balls of radius r in N^n and $\mathbb{N}^m_k$, respectively. In a recent joint work with my colleagues quoted above, we proved that if $\Theta(r)$ grows sub-exponentially ($k > 0$) or sub-polynomially ($k = 0$) along a sequence, then the spectrum $\sigma(M)$ of the Laplace-Beltrami operator of M is the whole half-line $[(m-1)^2k/4, +\infty)$. Notably, the criterion applies to all Anderson's solutions of Plateau's problem at infinity on the hyperbolic space, independently from their boundary regularity. I will also briefly comment on the relationship between the total curvature of minimal submanifolds and the finiteness of the limit of $\Theta(r)$ at infinity.