On the spectrum of minimal submanifolds in space forms

Luciano Mari

Scuola Normale Superiore di Pisa

luciano.mari@sns.it, mari@mat.ufc.br

Abstract

Let $\varphi : M^m \to N^n$ be an immersed minimal submanifold in an ambient space close, in a suitable sense, to the space form $\mathbb{N}_k^n$ of sectional curvature $-k \leq 0$. In this talk, I survey on some recent results obtained in collaboration with various colleagues from Brazil, to ensure that the Laplace-Beltrami operator of M has purely discrete (respectively, purely essential) spectrum. In the last case, we also give an explicit description of the spectrum. Our criteria apply to many examples of minimal submanifolds constructed in the last 30 years, and answer a question posed by S.T.Yau in his Millenium lectures. The geometric conditions involve the Hausdorff dimension of the limit set of φ and the behaviour at infinity of the density function

$$\Theta(r) = \frac{\mathrm{vol}(M \cap B_r^n)}{\mathrm{vol}(\mathbb{B}_r^m)},$$

where $B_r^n, \mathbb{B}_r^m$ are geodesic balls of radius r in N^n and $\mathbb{N}_k^m$, respectively.