

RIGIDITY AND GAP RESULTS FOR SPACELIKE SUBMANIFOLDS WITH PARALLEL MEAN CURVATURE VECTOR IN SPACE FORMS $\mathbb{L}_q^{n+p}(c)$

Weiller Barboza

Universidade Federal de Campina Grande (UFCG), Brazil
weiller.felipe@professor.ufcg.edu.br

In this talk, we present recent rigidity and gap-type results for spacelike submanifolds with parallel mean curvature vector immersed in semi-Riemannian space forms. The main focus will be the geometric study of complete spacelike submanifolds in pseudo-Riemannian space forms $\mathbb{L}_q^{n+p}(c)$ with $1 \leq q \leq p$ of constant sectional curvature $c \in \{-1, 0, 1\}$. Initially, we discuss geometric and analytic conditions ensuring that a spacelike submanifold is either totally umbilical or belongs to highly rigid geometric classes, such as maximal isoparametric spacelike submanifolds. Next, we present characterization results obtained under natural assumptions involving volume growth, decay of the traceless second fundamental form, and global properties related to stochastic completeness. The talk will also address lower estimates for the norm of the traceless second fundamental form, emphasizing equality cases associated with pseudo-umbilical submanifolds having constant principal curvatures. Among the main tools employed are the Omori–Yau maximum principle, stochastic completeness, parabolicity, and the L^1 -Liouville property. The goal is to illustrate how global analytic methods can be combined with techniques from differential geometry in order to produce rigidity phenomena in semi-Riemannian settings.

Trabajo en conjunto con Henrique F. de Lima (Universidade Federal de Campina Grande, Brazil) y Marco A.L. Velásquez (Universidade Federal de Campina Grande, Brazil).

Referencias

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- [2] Barboza, W.F.C., de Lima, H.F. Velásquez, M.A.L. Spacelike submanifolds with parallel mean curvature vector in the de Sitter space: characterizations and gaps. *Rend. Circ. Mat. Palermo, II. Ser* 73, 835–855 (2024). <https://doi.org/10.1007/s12215-023-00955-8>