

# GEOMETRY & PHYSICS SEMINAR

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## **A Smale-Barden manifold admitting K-contact but not Sasakian structure**

Vicente Muñoz (Univ. Complutense, Madrid)

### **Abstract:**

Sasakian manifolds are odd-dimensional counterparts of Kahler manifolds in even dimensions, with K-contact manifolds corresponding to symplectic manifolds. In this talk, we give the first example of a simply connected compact 5-manifold (Smale-Barden manifold) which admits a K-contact structure but does not admit any Sasakian structure, settling a long standing question of Boyer and Galicki.

For this, we translate the question about K-contact 5-manifolds to constructing symplectic 4-orbifolds with cyclic singularities containing disjoint symplectic surfaces of positive genus. The question on Sasakian 5-manifolds translates to the existence of algebraic surfaces with cyclic singularities containing disjoint complex curves of positive genus. A key step consists on bounding universally the number of singular points of the algebraic surface.