

Bourgeois contact structures: tightness, fillability and applications

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Starting from a contact manifold and a supporting open book decomposition, an explicit and elegant construction by Bourgeois provides a contact structure in the product of the original manifold with the two-torus. By work of Eliashberg in dimension 3 and Borman-Eliashberg-Murphy in higher dimensions, contact manifolds are classified in two flavours: tight, or overtwisted, where the latter are flexible.

In this talk, we will show that Bourgeois contact structures are, in dimension 5, always tight, independent on the rigid/flexible classification of the original contact manifold. We will also discuss results on their symplectic fillability, which in particular provide new examples of weakly but not strongly fillable contact 5-manifolds. We expect, as an application, that the standard contact structure in the unit cotangent bundle of the n -torus, which is a Bourgeois manifold, admits a unique aspherical filling up to diffeomorphism.

This is joint work with Jonathan Bowden and Fabio Gironella.