

High-dimensional contact and symplectic geometry via open books

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A very useful strategy in studying topological manifolds is to factor them into “smaller” pieces. An open book decomposition of an n -manifold (the open book) is a fibration that helps us study our manifold in terms of its $(n - 1)$ -dimensional submanifolds (i.e. fibers = the pages) and $(n - 2)$ -dimensional boundary of these submanifolds (the binding). Open books provide a natural framework for studying topological properties of certain geometric structures on smooth manifolds such as “contact structures”. Thanks to open books, contact manifolds, odd dimensional smooth manifolds carrying these geometric structures, can be studied from an entirely topological viewpoint. For example, every contact 3-manifold can be presented as an open book whose pages are surfaces and binding is a knot/link. In this talk, we will talk about higher-dimensional contact manifolds and provide a setting where we study these manifolds in terms of 3D open books. We also present various results along with examples concerning geometric and topological aspects of contact and symplectic manifolds along with upcoming work concerning these special fibrations.

References

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