Exotic smoothness on open 4-manifolds in string theory and generalized geometries

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Superstring theory is a rich collection of mathematical procedures leading to the quantization of gravity. It is consistent in 10 dimensions $(9+1)$ and a usual way toward 4 physical dimensions is via compactifications and dualities. The result, however, is highly degenerate - there are $\sim 10^{500}$ 4 dim. possible backgrounds. Radial family of small exotic $\mathbb{R}^4$ is the continuum many distinct smooth exotic $\mathbb{R}^4$ which all embed in the standard $\mathbb{R}^4$ and are parameterized by the real radius ρ. Such radial family $\mathbb{R}^4_\rho$ determines the family of codimension-1 foliations of S^3, with Godbillon-Vey number equal to ρ^2 (see the Torsten Asselmeyer-Maluga talk at this session). I show how to translate certain exact 10 dim. superstring solutions into 4 dim. radial family. The solutions are, in particular, the Callan-Harvey-Strominger linear dilaton (1991) and the Kounas-Kiritsis solution (1994). The connection with the generalized geometry of Hitchin-Gualtieri is also discussed.