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Equivariant inverse spectral theory and toric orbifolds

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Let O be a symplectic toric $2n$ -dimensional orbifold with a fixed T^n -action and with a toric Kahler metric g . We previously explored whether, when O is a manifold, the equivariant spectrum of the Laplace operator acting on smooth functions on (O, g) determines the moment polytope of O , and hence by Delzant's theorem determines O up to symplectomorphism. In the setting of toric orbifolds we significantly improve upon our previous results and show that the moment polytope of a generic toric orbifold is determined by its equivariant spectrum, up to two possibilities and up to translation. This involves developing the asymptotic expansion of the heat trace on an orbifold in the presence of an isometry. We also show that the equivariant spectrum determines whether the toric Kahler metric has constant scalar curvature.

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