

# Toroidal $b$ -divisors and applications in differential and arithmetic geometry

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We define toroidal  $b$ -divisors on a quasi projective variety over a field. These can be seen as conical functions on a balanced polyhedral space. We show the existence of an intersection pairing for so called nef toroidal  $b$ -divisors, which gives rise to a Monge-Ampère type measure on the polyhedral space. Moreover, using the theory of Okounkov bodies, we show that a Hilbert-Samuel type formula holds in this setting. We then show some applications of this theory. First, we show some Chern-Weil type formulae for singular semi-positive metrics on line bundles. Then, using the Hilbert-Samuel formula, we compute asymptotic dimension formulae of spaces of automorphic forms on mixed Shimura varieties.