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Bergman kernel, balanced metrics and black holes

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We rederive the expansion of the Bergman kernel on Kahler manifolds developed by Tian, Yau, Zelditch, Lu and Catlin, using path integral and perturbation theory, and consider its generalization for arbitrary magnetic field. This expansion is noteworthy as a geometric expansion, somewhat similar to the DeWitt–Seeley–Gilkey short time expansion for the heat kernel, but in this case describing the long time limit. We discuss physical applications of this result, in particular its relation to BPS black holes in string theory.