Erratum: Higher dimensional black holes and supersymmetry [Phys. Rev. D 68, 024024 (2003)]

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(Received 17 August 2004; published 15 October 2004)

DOI: 10.1103/PhysRevD.70.089902 PACS numbers: 04.70.Bw, 04.50.+h, 04.65.+e, 99.10.Cd

The argument used to exclude asymptotically flat solutions with near-horizon geometry $AdS_3 \times S^2$ is incorrect. The error lies in the penultimate paragraph of the Appendix, where it is wrongly asserted that the flat metric on R^4 cannot be written in the form (A16) (the argument that the base space must be regular at $\tilde{\rho} = 0$ may also be incorrect since the correction terms in (A16) are not manifestly regular there). With this correction, the results of this paper can be summarized in two theorems:

Theorem 1. Any supersymmetric solution with a (spatially) compact horizon has a near-horizon geometry that is locally isometric to one of the following maximally supersymmetric solutions: flat space, $AdS_3 \times S^2$, or the near-horizon geometry of the Breckenridge, Myers, Peet, and Vafa (BMPV) solution (of which $AdS_2 \times S^3$ is a special case). The geometry of the horizon in these three cases is the standard metric on T^3, $S^1 \times S^2$, or (a quotient of) a squashed S^3, respectively.

Theorem 2. The only asymptotically flat supersymmetric black hole solution with near-horizon geometry locally isometric to the near-horizon BMPV solution is the BMPV black hole.

These theorems constitute a uniqueness theorem for supersymmetric black holes whose near-horizon geometry is not flat space or $AdS_3 \times S^2$. Note that this is much stronger than simply proving uniqueness for given horizon topology—any supersymmetric black hole other than BMPV must have an event horizon with *geometry* T^3 or $S^1 \times S^2$. The latter possibility would describe a supersymmetric black ring and such a solution has now been found [1].

[1] H. Elvang *et al.*, hep-th/0407065.

1550-7998/2004/70(8)/089902(1)$22.50