Correction to: Stable Minimal Surfaces and Spatial Topology in General Relativity

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Theodore Frankel¹ and Gregory J. Galloway²

¹ Department of Mathematics, University of California, La Jolla, CA 92093, USA

² Department of Mathematics and Computer Science, University of Miami,
Coral Gables, FL 33124, USA

The statements of all theorems and lemmas appearing in our paper are correct as they stand, but there is an error in the proof of Lemma 2. To arrive at the inequality immediately preceding (10) we made use of inequality (4.6) in Reference [3], which, however, is not applicable to the situation considered in Lemma 2. Here we correct the proof of Lemma 2. The text of our paper, from the sentence on p. 401 which begins three lines after (8) to the end of the proof of Lemma 2, should be replaced by the following:

From equations 12–15 and 12–22 in Frankel [1] we have,

$$\varphi^{-1} \nabla_V^2 \varphi = \text{Ric}(e_0, e_0) + \frac{d\theta}{d\tau} + \sum_{\alpha, \beta=1}^3 \theta_{\alpha\beta}^2$$

where $\theta_{\alpha\beta} = \theta(e_\alpha, e_\beta)$ are the components of the expansion tensor with respect to the orthonormal basis $e_1 = N, e_2, e_3$. Comparing with (5) (which applies to static space-times) we have,

$$\text{Ric}_0(e_0, e_0) \geq \text{Ric}(e_0, e_0) + \frac{d\theta}{d\tau} + \sum_{\alpha=1}^3 \theta_{\alpha\alpha}^2. \quad (9)$$

The generalization of (4) to the space-time setting of Theorem 1 is given in Galloway [3]. From Lemmas 4.1 and 5.1 of that paper we have,

$$\text{Ric}_V(N, N) \geq \text{Ric}(N, N) + \varphi^{-1} \frac{d^2 \varphi}{dl^2} - \frac{d^2}{d\tau^2} \|N\| + \theta_{11}^2 - \theta \theta_{11}. \quad (A)$$

The equation, $\theta = \sum_{\alpha=1}^3 \theta_{\alpha\alpha}$, and the inequalities,

$$\theta_{11} \theta_{\beta\beta} \leq \frac{1}{2} (\theta_{11}^2 + \theta_{\beta\beta}^2), \quad \beta = 2, 3$$

imply,

$$\theta_{11}^2 - \theta\theta_{11} \geq -\theta_{11}^2 - \frac{1}{2}\theta_{22}^2 - \frac{1}{2}\theta_{33}^2. \quad (\text{B})$$

Comparing (A) and (B) with (4) we obtain

$$\text{Ric}_0(N, N) \geq \text{Ric}(N, N) - \frac{d^2}{d\tau^2} \|N\| - \theta_{11}^2 - \frac{1}{2}\theta_{22}^2 - \frac{1}{2}\theta_{33}^2. \quad (10)$$

Adding inequalities (9) and (10) and substituting into (8) yields the desired inequality.

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