

Abstract Submitted  
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**Quantitative rubber sheet models of gravitation wells using Spandex** GARY WHITE, American Institute of Physics/Society of Physics Students — Long a staple of introductory treatments of general relativity, the rubber sheet model exhibits Wheeler’s concise summary—“Matter tells space-time how to curve and space-time tells matter how to move”—very nicely. But what of the quantitative aspects of the rubber sheet model: how far can the analogy be pushed? We show<sup>1</sup> that when a mass  $M$  is suspended from the center of an otherwise unstretched elastic sheet affixed to a circular boundary it exhibits a distortion far from the center given by  $h = A*(M*r^2)^{1/3}$ . Here, as might be expected,  $h$  and  $r$  are the vertical and axial distances from the center, but this result is not the expected logarithmic form of 2-D solutions to Laplace’s equation (the stretched drumhead). This surprise has a natural explanation and is confirmed experimentally with Spandex as the medium, and its consequences for general rubber sheet models are pursued. <sup>1</sup>“The shape of ‘the Spandex’ and orbits upon its surface”, *American Journal of Physics*, **70**, 48-52 (2002), G. D. White and M. Walker. See also the comment by Don S. Lemons and T. C. Lipscombe, also in *AJP*, **70**, 1056-1058 (2002).

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