Rotational surface with quadratic ellipses

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We prove that ellipses and hyperbolas are quadratic curves on every 2-dimensional Riemannian manifold of constant curvature. We formulate a conjecture, that the only 2-dimensional Riemannian manifolds where the ellipses are quadratic curves, are that of constant curvature. We provide examples supporting this conjecture.

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[3] Á. Kurusa, The invertibility of the Radon transform on abstract rotational manifolds of real type, *Math. Scand.*, **70** (1992), 112-126.