1077-11-797 **Brendan Hassett**, Department of Mathematics MS 136, Rice University, 6100 S. Main St., Houston, TX 77005, and **Anthony Varilly-Alvarado*** (varilly@rice.edu), Department of Mathematics MS 136, Rice University, 6100 S. Main St., Houston, TX 77005. *Failure of the Hasse principle on general K3 surfaces.*

Transcendental elements of the Brauer group of an algebraic variety, i.e., Brauer classes that remain nontrivial after extending the ground field to an algebraic closure, are quite mysterious from an arithmetic point of view. These classes do not arise for curves or surfaces of negative Kodaira dimension. In 1996, Harari constructed the a 3-fold with a transcendental Brauer-Manin obstruction to the Hasse principle. Until recently, his example was the only one of its kind. We show that transcendental elements of the Brauer group of an algebraic *surface* can obstruct the Hasse principle. We construct a general K3 surface X of degree 2 over $\mathbb{Q}$, together with a two-torsion Brauer class α that is unramified at every finite prime, but ramifies at real points of X. Motivated by Hodge theory, the pair (X, α) is constructed from a double cover of $\mathbb{P}^2 \times \mathbb{P}^2$ ramified over a hypersurface of bi-degree $(2, 2)$. (Received September 12, 2011)