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Abhinav Kumar* (abhinavk@alum.mit.edu), Microsoft Corporation, One Microsoft Way, Redmond, WA 98052. *K3 surfaces of high rank and Kummer surfaces.*

We will discuss algebraic K3 surfaces (defined over the complex or rational numbers) whose Neron-Severi lattice has high rank. In particular we focus on those K3 surfaces X which have a Shioda-Inose structure, that is, X has an involution ι which fixes any regular $(2, 0)$ -form, and the quotient $X/\{1, \iota\}$ is birational to a Kummer surface Y , which is the desingularisation of $A/\{1, -1\}$ for some abelian surface A . In particular, we can write down an explicit family of elliptic K3 surfaces with specified reducible fibers such that the birational quotient Y is always the Kummer surface of a principally polarized abelian surface. In the case when $Y = Km(J(C))$ for a curve C of genus two, we can give the equations for X and ι explicitly in terms of the Igusa-Clebsch invariants of C . This construction has some number theoretic applications: for instance, we can write down a parametrization of certain quotients of Hilbert modular surfaces (which are moduli spaces for abelian surfaces with real multiplication by a real quadratic field). (Received September 04, 2006)