ON RATIONALITY OF CONIC BUNDLES THREEFOLDS OVER NONCLOSED FIELDS

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For geometrically rational surfaces, determining their rationality over a nonclosed field reduces to a question about the Galois action on the finite collection of curves that generate the Picard group. For geometrically rational threefolds, however, the question becomes much more complicated and many aspects remain open. In this talk, we consider the rationality question for certain conic bundle threefolds. In this case, we show that the so-called intermediate Jacobian torsor (IJT) rationality obstruction of Hassett–Tschinkel and Benoist–Wittenberg can be framed in terms of arithmetically interesting torsors under a Prym variety. Using the structure of these torsors we show that the IJT obstruction characterizes rationality for these conic bundles over fields with trivial 2-torsion in the Brauer group, but that it is not strong enough to characterize rationality over arbitrary fields. This is joint work with S. Frei, L. Ji, S. Sankar, and I. Vogt.