GRAVITATIONAL INSTANTONS AND RATIONAL SURFACES

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I will begin with some background discussion of a class of complete non-compact hyperkahler metrics in dimension 4, which are known as "gravitational instantons." A famous example is that of Eguchi-Hanson found in 1979. Since then, examples with many other types of asymptotic geometries have been discovered. Through the works of many authors, gravitational instantons have recently been completely classified, and I will also discuss some aspects of this classification. In particular, these spaces can always be compactified complex analytically to rational surfaces. The classification involves techniques from complex geometry, differential geometry, and PDE theory.