Almost all Steiner triple systems are almost resolvable

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An order-n Steiner triple system is a collection of triples of a size-n ground set, covering each pair of elements exactly once. Such a system is said to be *resolvable* if its triples can be partitioned into $(n-1)/2$ disjoint perfect matchings. It is easy to see that order-n resolvable Steiner triple systems can only exist when n is congruent to 3 mod 6, but a much more difficult problem (famously solved by Ray-Chaudhuri and Wilson) is to show that this divisibility condition is in fact sufficient for existence.

Despite the difficulty of even proving that resolvable Steiner triple systems exist, intuition about random hypergraphs suggests that actually *almost all* Steiner triple systems are resolvable. As a step in this direction we prove that if n is congruent to 3 mod 6 then almost all order-n Steiner triple systems are *nearly* resolvable, admitting a packing of $n/2 - o(n)$ disjoint perfect matchings.