On the Thom conjecture in $\mathbb{CP}^3$

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The original Thom conjecture states that holomorphic curves are minimal genus representatives of 2-dimensional homology classes in $\mathbb{CP}^2$. It has been known for a long time that the analogous claim for codimension 2 homology classes in $\mathbb{CP}^n$ for even $n \geq 4$ does not hold; Freedman showed that for these n any such class is represented by a submanifold which has smaller middle homology than a complex hypersurface representing this class and which on the level of homotopy behaves as a complex hypersurface. We consider the case of 4-manifolds in $\mathbb{CP}^3$ and show that the rank of the 2nd homology in any given class can be significantly reduced. This is joint work with D. Ruberman and M. Slapar.

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