1046-14-679   **Frank Sottile*** (`sottile@math.tamu.edu`), Department of Mathematics, Texas A&M University, Mail stop 3368, College Station, TX 77843. *Frontiers of reality in Schubert calculus.*

The Shapiro conjecture for Grassmannians (now a Theorem of Mukhin, Tarasov, and Varchenko) asserts that all (a priori complex-number) solutions to certain geometric problems from the Schubert calculus are actually real. Their proof is quite remarkable, using ideas from integrable systems and representation theory. This result has been used by Purbhoo to show that some basic combinatorial algorithms arise from geometry. Despite these advances, the full Shapiro conjecture remains open with several interesting and not quite understood generalizations that are likely true.

This talk will introduce the Shapiro conjecture for Grassmannians and its links to subjects from combinatorics to complex analysis to control theory and then give an idea of its proofs and consequences, and its extensions. (Received September 15, 2008)