SU-bordism: geometric representatives, operations, multiplications and projections

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The development of algebraic topology in the 1960s culminated in the description of the special unitary bordism ring. Most leading topologists of the time contributed to this result, which combined the classical geometric methods of Conner-Floyd, Wall and Stong with the Adams-Novikov spectral sequence and formal group law techniques that emerged after the fundamental 1967 work of Novikov.

Thanks to toric topology, a new geometric approach to calculations with SU-bordism has emerged, which is based on representing generators of the SU-bordism ring and other important SU-bordism classes by quasitoric manifolds and Calabi-Yau hypersurfaces in toric varieties.

We shall also discuss more specific topics related to SU-bordism. Namely we show that SU-linear operations in complex cobordism are generated by the well-known geometrical operations ∂_i. For the theory W of c_1-spherical bordism, we describe SU-linear multiplications on W and projections $MU \to W$. We also analyse complex orientations on W and prove results on the s-numbers of the coefficients of the corresponding formal group laws. The talk is based on joint work with Zhi Lu, Ivan Limonchenko and Georgy Chernykh.