Powers of Volume Forms on Manifolds with Boundary

Abstract:
In this talk I will consider the problem of local analytic classification of powers of volume forms on manifolds with boundary, i.e. of ordinary volume forms multiplied by the (complex in general) power of a function $f$, under the action of the group of diffeomorphisms preserving both the boundary and the hypersurface defined by the zero locus of $f$. In the case where this function defines an isolated boundary singularity in the sense of Arnol'd, I will show how to obtain local normal forms and moduli theorems, analogous to those obtained by Arnol'd, Varchenko, Lando and others for the ordinary, without boundary case. Moreover I will show how these moduli are related to (in fact obtained by) the topological and analytic (Hodge theoretic) invariants of the boundary singularity, such as the relative Picard-Lefschetz monodromy, the relative Brieskorn lattices with their relative Gauss-Manin connection, the relative spectrum and so on, all objects generalising, in the presence of a boundary, the corresponding well known objects already defined for isolated hypersurface singularities.