

**Stony Brook University  
The Graduate School**

Doctoral Defense Announcement

**Abstract**

Bott-Samelson-Demazure-Hansen Varieties for Projective Homogeneous Varieties with  
Nonreduced Stabilizers

By

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Over a field of positive characteristic, a reductive algebraic group may contain some nonreduced parabolic subgroups. In this thesis, we study the exotic Schubert and Bott-Samelson-Demazure-Hansen (BSDH) varieties associated to the non-reduced parabolics. It is shown that in general the exotic Schubert and BSDH varieties are not normal, and the projection of the exotic BSDH variety onto the exotic Schubert variety has nonreduced fibers at closed points. When the base field is finite, the convolution morphisms between the exotic BSDH varieties are also studied. It is shown that the decomposition theorem holds for such morphisms, and the pushforward of intersection complexes by such morphisms are Frobenius semisimple.

**Date:** April 26th, 2023

**Time:** 2:15 pm

**Place:** Math Building, Room 4-130

**Program:** Mathematics

**Dissertation Advisor:** Mark de Cataldo