The intersection cohomology of the moduli space of Higgs bundles on a smooth projective curve

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Abstract: Let $X$ be a smooth projective curve of genus $g$ over $\mathbb{C}$. The character variety $\mathcal{M}_B$ parametrizing conjugacy classes of representations from the fundamental group of $X$ into $\text{SL}(2, \mathbb{C})$ is an affine irreducible singular projective variety. The Non Abelian Hodge theorem, states that there is a real analytic isomorphism between $\mathcal{M}_B$ and the quasi projective singular variety $\mathcal{M}_{Dol}$ which parametrizes semistable Higgs bundles of rank 2 and degree 0 on $X$. During the seminar I will present a desingularization of these moduli spaces and compute several informations about their intersection cohomology using the famous Decomposition theorem by Beilinson, Bernstein, Deligne and Gabber. Time permitting, I will explain some possible applications to the so called $P=W$ conjecture, stated and proved by De Cataldo, Hausel and Migliorini in the case of rank 2 and degree 1 Higgs bundles.

The talk is part of the 2-day meeting <a href="http://schapos.people.uic.edu/SpectralhiggsIII.html">"Current trends on spectral data for Higgs bundles III"</a>.