Abstract: The braid groups, first introduced by Emil Artin, have been studied for almost a century. Two new families of braid-like groups have gained importance over the past twenty years: the welded and the virtual braid groups.

In this talk, I will first introduce the "pure" subgroups of these groups, and review their cohomology algebras, associated graded Lie algebras, Betti numbers and LCS ranks. I will then discuss the first resonance varieties and the Chen ranks of the pure welded and virtual braid groups. As an application, I will use these invariants to test the formality properties and decide various isomorphism problems within this class of groups. This talk is about joint work with Alex Suciu.