

GAUSS COMPOSITION AND HIGHER COMPOSITION LAWS

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ABSTRACT. In this talk, I will describe Bhargava's remarkable generalization of Gauss composition on binary quadratic forms to higher degree forms such as binary cubic forms, senary alternating 3-forms, pairs of binary quadratic forms, and pairs of quaternary alternating 2-forms. I will explain Bhargava's methodology and how these spaces of forms parametrize arithmetic objects associated to quadratic number fields. Lastly, I will give an outline of an ongoing work with my advisor Gautam Chinta (as part of my PhD) on formulating the higher composition laws in a manner similar to Gauss's formulation in the binary quadratic forms case.