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Adam Van Tuyl* (avantuy1@sleet.lakeheadu.ca), **Christopher A. Francisco** and **Huy Tài Hà**. *Powers of cover ideals and their associated primes*. Preliminary report.

Let G be a finite simple graph on the vertex set $V = \{x_1, \dots, x_n\}$ and edge set E . The edge ideal of G is the quadratic square-free monomial ideal $I(G)$ generated by the monomials $x_i x_j$ whenever $\{x_i, x_j\} \in E$. The cover ideal $J = I(G)^\vee$ is the Alexander dual of $I(G)$; the name cover ideal refers to the fact that the minimal generators of J correspond to the minimal vertex covers of the graph G . In this talk, I will discuss my current project (joint with C. Francisco and T. Hà) to understand the elements of $\text{Ass}(R/J^s)$, the set of associated primes with $s \geq 2$. In particular, I will discuss how computer experiments have shown a link between colorings of the graph, the perfection of the graph, and the elements of $\text{Ass}(R/J^s)$. I will also discuss a new algebraic way to calculate the chromatic number of a graph. (Received July 22, 2008)