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Molly Lynch* (melynch4@ncsu.edu). *On the combinatorics of crystal posets*. Preliminary report.

Crystal bases were introduced by Kashiwara when studying modules of quantum groups. These crystals are combinatorial structures that mirror representations of Lie algebras. Each crystal base has an associated crystal graph. Many crystals have a natural poset structure. In this talk, we explore the combinatorics of crystal posets associated to highest weight representations of finite Cartan type. In doing so, we use a tool from topological combinatorics called lexicographic discrete Morse functions. This allows us to relate the Möbius function of an interval in a crystal poset to the types of relations that exist among crystal operators in that interval. Additionally, we show that crystal posets associated to highest weight representations of types B_{-2} and C_{-2} are not lattices. (Received January 25, 2019)