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**Joshua Hallam** (joshua.hallam@lmu.edu), **Matt Farmer** (cmfarmer@uncg.edu) and **Clifford Smyth\*** (cdsmyth@uncg.edu). *The Non-Crossing Bond Poset*. Preliminary report.

A bond of a graph  $G$  is a spanning subgraph  $H$  such that each component of  $H$  is an induced subgraph of  $G$ . The bonds of a graph  $G$ , when ordered by inclusion, form the so-called bond lattice,  $L(G)$  of  $G$ , an interesting sub-lattice of the well-studied set partition lattice. Bond lattices enjoy many interesting algebraic properties and there are interesting combinatorial formulations of the Moebius function and characteristic polynomial of these lattices.

We order the vertices of  $G$  and say two components in a bond are crossing if there are edges  $ik$  in one and  $jl$  in the other such that  $i < j < k < l$ . We say a bond is non-crossing if no two of its components cross.

We study the non-crossing bond poset,  $NC(G)$ , the set of non-crossing bonds of  $G$  ordered by inclusion, an interesting sub-poset of the well-studied non-crossing set partition lattice. We study to what extent the combinatorial theorems on  $L(G)$  have analogues in  $NC(G)$ . (Received September 09, 2019)