1058-57-74 **Patricia Cahn*** (patricia.cahn@dartmouth.edu), 6188 Kemeny Hall, Dartmouth College, Hanover, NH 03755. *A Generalization of the Turaev Cobracket and the Minimal Self-Intersection Number.* Preliminary report.

Goldman and Turaev constructed a Lie bialgebra structure on the free $\mathbb{Z}$-module generated by free homotopy classes of loops on a surface. The Turaev cobracket $\Delta(\alpha)$ gives a lower bound on the minimal number of self-intersection points of a loop in a given homotopy class. Chas found examples which prove that this lower bound is not sharp. In particular, she constructed a class α with $\Delta(\alpha) = 0$, but which is not realized by a power of a simple loop. This disproves Turaev's conjecture that $\Delta(\alpha) = 0$ if and only if α can be realized by a power of a simple loop. We introduce an operation μ, defined in the spirit of the Andersen-Mattes-Reshetikhin algebra of chord diagrams. The Turaev cobracket factors through μ, and μ also gives a lower bound on the minimal number of self-intersection points of a loop in a given homotopy class. We show that this lower bound is sharp for homotopy classes α such that $\alpha \neq \beta^i$ for $|i| > 1$. We also show that $\mu(\alpha) = 0$ if and only if α can be realized by a power of a simple loop, thus showing that a statement similar to Turaev's conjecture is true. (Received February 02, 2010)