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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.*

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 Δ gives a lower bound on the minimum 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 general. In particular, she constructed a class α such that $\Delta(\alpha) = 0$, where α is not realized by a power of a simple loop. This disproves a conjecture of Turaev. 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, so that μ gives a formula for the minimal self-intersection number. We also show that an analogue of Turaev's conjecture holds for μ . (Received September 12, 2010)