## Ribbon 2-knots assoiciated with symmetric unions

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**Abstract.** A symmetric union was introduced by Kinoshita and Terasaka in the 1950's, which is a generalization of the connected sum operation for a knot and its mirror image. It has been generalized by Lamm recently. Every symmetric union is a ribbon knot and it has been shown that a ribbon knot with crossing number less than or equal to ten is a symmetric union. We ask if every ribbon 2-knot has a symmetric union as an equatorial cross section (i.e. every ribbon 2-knot is assoiciated with symmetric union) because every 2-knot has a ribbon knot as an equatorial cross section. In this talk, we prove that every ribbon 2-knot of 1-fusion is assoiciated with a symmetric union for the unknot or a 2-bridge knot. We also introduce a banded symmetric union to study a ribbon 2-knot and we generalize a result of Kanenobu concerning some family of ribbon 2-knots.