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	Colloquium on Loigc and Epistemology in Bochum
	Expanding the realm of Belnap-Dunn logic: Self-extensional four-valued paradefinite logic, subtrilattice logic, and symmetric paraconsistent quantum logic
	○ Norihiro Kamide
	This study investigates Avron's self-extensional four-valued paradefinite logic, subtrilattice logic, and symmetric paraconsistent quantum logic. The first is an extension of Belnap-Dunn logic, and the second and third are extensions or generalizations of non-distributive Belnap-Dunn logic. The first section of this talk presents the investigation of Avron's self-extensional four-valued paradefinite logic, referred to here as A4 in a Gentzen-type sequent calculus style. A4 is known to be the unique self-extensional extension of Belnap-Dunn logic with the addition of classical implication. It is observed that A4 is the classical-negation-free fragment of De and Omori's axiomatic extension BD+ of Belnap-Dunn logic with the addition of classical negation and classical implication. Theorems for embedding A4 into a Gentzen-type sequent calculus LK for propositional classical logic (with classical negation) are proved and the completeness (with respect to a valuation semantics) and cut-elimination theorems for A4 are obtained using these embedding theorems. Similar theorems are also obtained for an extension A4c of A4 by adding conflation. The second section of this talk presents the investigation of the subtrilattice logic, referred to here as STL. STL is regarded as a new trilattice logic and as an extension or generalization of non-distributive Belnap-Dunn logic, which is also referred to as paraconsistent quantum logic. STL is introduced in the form of a monosequent calculus, which is based on a restricted sequent that contains exactly one formula in both the antecedent and the succedent. The completeness (with respect to the lattice-valued semantics), cut-elimination, decidability, and Craig interpolation theorems for STL are proved using an embedding-based technique. The final section of this talk presents the investigation of the symmetric paraconsistent quantum logic, referred to here as SPQL. SPQL is introduced as a dual monosequent calculus, which is an indexed and generalized monosequent calculus. SPQL is regarded as an extension or generalization of Dalla Chiara and Giuntini's paraconsistent quantum logic PQL, which is regarded as a variant of non-distributive Belnap-Dunn logic. Theorems for embedding SPQL into PQL and vice versa are proved. Furthermore, cut-elimination, symmetry-elimination, contraposition-elimination, and algebraic-completeness theorems are proved for SPQL.