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Louis H Kauffman* (kauffman@uic.edu), Louis H Kauffman, 5530 South Shore Drive, Apartment 7C, Chicago, IL 60637-1946. *General Relativity, Constraints Theory and Non-Commutative Worlds*. Preliminary report.

This talk is joint work with Anthony Deakin. We study the constraints imposed by representing differentiation by commutators in non-commutative worlds so that basic identities in advanced calculus remain true. The most elementary constraints demand a quadratic Hamiltonian and so, in this way, relate classical and quantum formulations. The next constraint, via an observation of Clive Kilmister, leads to a second order version of Einstein's equations for General Relativity. We explain this connection and discuss some of the consequences and questions that arise. (Received January 22, 2018)