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Marius - Junge* (junge@math.uiuc.edu), 1409 West Green Street, Urbana, IL 61801, and **Eric Ricard** and **Dimar Shlyahktenko**. *Non commutative diffusion semigroups*. Preliminary report.

The generator of a commutative diffusion semigroup is essentially given by a second order differential equation. Equivalent formulations have been found by Bakry and Emery in terms of differentiability conditions for the gradient, and the existence of a suitable Markov dilation. This is closely related to the martingale problem. We investigate those semigroups which are driven by a free brownian motion and characterize them in terms of the gradient form. The class turns out to be extremely rich. (Received September 20, 2010)