

## Robba rings for uniform $p$ -adic Lie groups

### Abstract

On the one hand the Robba ring is a fundamental tool in the theory of  $p$ -adic differential equations. On the other hand Fontaine has constructed an equivalence of categories between the category of  $p$ -adic Galois representations over the field  $(\mathbb{Q}_p)$  and the category of étale modules over a norm-complete relative of the Robba ring. Furthermore, Colmez in recent work relates these étale modules to Banach space representations of the Borel subgroup  $B_2$  in  $GL_2(\mathbb{Q}_p)$ ; if the étale module has rank two he in fact obtains a Banach representation of the full group  $GL_2(\mathbb{Q}_p)$ . In this talk I will report on the construction of an analog of the Robba ring  $R(G)$  and its norm-complete relative  $E(G)$  for any uniform  $p$ -adic Lie group  $G$ . This will be applied to appropriate compact subgroups  $N_0$  in the unipotent radical of the Borel subgroup  $B_n$  in  $GL_n(\mathbb{Q}_p)$ . There is a notion of étale modules over the corresponding ring  $E(N_0)$  as well as a functor to Banach space representations of  $B_n$ . The relation to Galois representations still is work in progress.