p-extensions of local fields with Galois groups of nilpotent class <p

Abstract:

Let $K$ be a complete discrete valuation field with finite residue field of characteristic $p > 0$. Let $G$ be the absolute Galois group of $K$ and for a natural $M$, let $G(M)$ be the maximal quotient of $G$ of nilpotent class $< p$ and period $p^M$. Then $G(M)$ can be identified with a group obtained from a Lie $\mathbb{Z}/p^M$-algebra $L$ via (truncated) Campbell-Hausdorff composition law. Under this identification the ramification subgroups in upper numbering $G(M)^{(v)}$ correspond to ideals $L^{(v)}$ of $L$. It will be explained an explicit construction of $L$ and the ideals $L^{(v)}$. The case of fields $K$ of characteristic $p$ was obtained by the author in 1990’s (recently refined), the case of fields $K$ of mixed characteristic requires the assumption that $K$ contains a primitive $p^M$-th root of unity (for the case $M=1$ cf. Number Theory Archive).