

**On the (Hopf-)Galois module structure of  
integers of  $p$ -adic fields**

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Let  $L/K$  be a Galois extension with Galois group  $G$ . The Normal Basis Theorem shows that  $L$  is a free  $K[G]$ -module of rank 1. When  $L/K$  is a number field or a local field extension, it is natural to consider the question of determining the structure of the ring of integers  $\mathcal{O}_L$  as a  $\mathcal{O}_K[G]$ -module. This is a difficult question that has long been studied.

In this talk, after an overview of the main classical results in this context, we will present some recent results, obtained with Fabio Ferri and Davide Lombardo, on the minimal index of a free  $\mathcal{O}_K[G]$ -submodule into  $\mathcal{O}_L$ , in the case when  $L/K$  is  $p$ -adic field extension.

If we will have time, we will also mention some result and open questions in the more general context of the study of Hopf–Galois module structures.