Interpretable fields and groups in various valued fields

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In this tutorial I will describe a current project, joint with Y. Halevi and A. Hasson, in which we study fields and more recently groups which are interpretable (namely realized as definable quotients) in three types of expansions of valued fields: (1) Expansions of polynomially bounded, o-minimal structures by a T-convex valuation ring (2) V-minimal expansions of algebraically closed valued fields and (3) P-adically closed fields. Although we study interpretable objects, our method bypasses general theorems on elimination of imaginaries, and instead reduces the investigation to definable objects in 4 distinguished sorts: The underlying fields K, the residue field, the value group and K/O, the quotient of K by its valuation ring. While the above three settings differ in many aspects, our treatment is uniform, using the fact that all have dp-rank 1. I will present the main ingredients of this project, and describe the results about fields and groups which we obtain.