Exposé plénier

1 *New point-counting results and applications*

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In 2006 Pila and Wilkie proved an asymptotic bound for the number of rational points in sets definable in o-minimal structures as a function of height. This theorem has led to many developments around functional transcendence and unlikely intersection problems such as the Andre-Oort conjecture. It has been conjectured by Wilkie that the Pila-Wilkie bound can be significantly improved, from sub-polynomial to polylogarithmic, in the o-minimal structure $\mathbb{R}_{\exp}$. I will discuss a new class of o-minimal structures called "sharply o-minimal structures", and our recent proof (with Novikov and Zack) of Wilkie's conjecture using this framework. I'll also discuss some partial results toward the conjecture that period maps of algebraic families live in a sharply o-minimal structure. Finally I'll explain the role that these results play in the recent resolution of the Andre-Oort conjecture.