Séminaire d'algèbre, géométrie et topologie
Jeudi 13 décembre à 14h
Salle I

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Titre : E_2 *cochains and brace bar-cobar duality*

Résumé : Mandell's theorem shows that the homotopy type of a space X is essentially determined by the E_∞ homotopy type of its cochains with integral coefficients $S^*(X, Z)$. Since the E_∞ structure has a filtration by "simpler" E_n structures, it is natural to ask what homotopical information remains.

I will give some examples showing how to distinguish spaces using these algebraic structures on cochains. Then, I will show that if we consider the E_2 structure on $S^*(X, Z/p)$, and if the connectivity r of X, the dimension d of X, and the prime p satisfy $d <= rp - p + 1$ (forcing the relevant Steenrod operations to be unavailable or zero), then $S^*(X, Z/p)$ is equivalent as an E_2 algebra to a commutative algebra, meaning the E_2 structure is essentially trivial for these spaces.

Along the way, we will also discuss a duality between E_2 algebras and Hopf algebras which comes from the classical bar-cobar duality of algebras and coalgebras, and we will see that our theorem follows from a straightforward rigidification of a theorem of Anick.