Jean Valles (University of Pau and Pays de l'Adour)

Title: Unexpected divisors of jumping lines

Abstract:
Let E a stable rank two vector bundle over $\mathbb{P}^n$. When $c_1(E)$ is odd, the expected codimension in $\mathrm{G}(1,\mathbb{P}^n)$ of the scheme of jumping lines of E is 2. When $c_1(E)$ is even, the expected codimension of the scheme of jumping lines of order ≥ 2 of E is 3. These codimensions are expected, but does it exist a stable rank two vector bundle with an unexpected divisor of jumping lines?

In $\mathbb{P}^2$, the answer is yes and there are, as far as I know, only two kinds of divisors: lines and smooth conics. When the divisor is supported by a single conic the bundle is the so-called Schwarzenberger's bundle.

In $\mathbb{P}^3$, Gruson and Peskine assert (their proof was improved by Han) that an unexpected irreducible divisor $K\subset \mathrm{G}(1,\mathbb{P}^n)$ of jumping lines is always the set oflines meeting an irreducible space curve C where C is the zero locus of a special section.

This nice result probably deserves to be better known. Many related problems are still open: does an irreducible unexpected cubic curve in $\mathbb{P}^2$ exist,

what happens for bundles of higher rank?