**LMS   SINGULARITY   DAY**

**Warwick**

**1 December 2016**

**room OC0.02, Oculus building**

***Programme:***

12:45 -- 1:30 Lunch in the café in the foyer of the Oculus building

1:30 -- 2:30 **Gavin Brown** (Warwick)

 Hodge numbers and explicit deformations of Fano 3-folds

2:30 -- 3:30 **Jacob Rasmussen** (Cambridge)

 Hilbert Schemes and HOMFLY-PT homology

3:30 -- 4:00 Tea

4:00 -- 5:00 **Slava Nikulin** (Steklov Institute, Moscow)

                    Degenerations of Kahlerian K3 surfaces with finite symplectic automorphism

 groups

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***Talk Abstracts:***

**Gavin Brown**  Hodge numbers and explicit deformations of Fano 3-folds

A Q-Fano 3-fold is a projective variety with ample anticanonical class and Q-factorial terminal singularities. The (topological) Euler characteristic is known for all Q-Fano 3-folds that have been constructed; we know several hundred deformation families, but not the complete classification. We calculate the finer Hodge numbers for these varieties, using the birational methods of their construction, which I will review. A formula relating Hodge numbers to the number of deformations (of both a Q-Fano 3-fold and a general anticanonical K3 surface inside it, the so-called 'elephant') gives a practical way to write down general deformations of Q-Fanos.

This is joint with Enrico Fatighenti (Warwick).

**Jacob Rasmussen**   Hilbert Schemes and HOMFLY-PT homology

Let X be a plane curve singularity, and let K be its link. Oblomkov and Shende conjectured, and Maulik proved, that the HOMFLY-PT polynomial of K can be recovered from data about the punctual Hilbert scheme of X. A natural (and still conjectural) generalization is that it should be possible to recover the HOMFLY-PT homology of Khovanov and Rozansky as well. I'll discuss this and related conjectures, as well as an approach (joint with Gorsky and Negut) to proving them using Hilbert schemes of points in the plane.

**Slava Nikulin** Degenerations of Kahlerian K3 surfaces with finite symplectic

 automorphism groups

I shall consider classification of degenerations of Kahlerian K3 surfaces with finite symplectic automorphism groups. For degenerations of codimension one, this classification was considered in several of my preprints, papers and talks (one of them at Warwick). In this talk, I shall consider this classification for arbitrary codimension,  2 and higher. See my recent preprint arXiv:1608.04373 for some details.