Donaldson-Thomas theory in Aussois - Program

Monday

1) overview talk on DT invariants (speaker : Damien)

2) virtual fundamental classes, after Behrend-Fantechi (speaker : Honglu)
Main reference : [BF]

3) Donaldson-Thomas type invariants, after Behrend (speaker : Sarunas)
Main reference : [B]

4) Holomorphic Casson invariant, after Thomas (speaker : Rufus)
Main reference : [T]

Tuesday

5) Overview/research talk on DT for 4-folds, after Donaldson-Thomas, Cao et al.,... (speaker : Jeongseok)

6) Categorified DT invariants 1: critical virtual manifolds, after Kiem-Li (speakers : David & Tristan)
Main reference : [KL] (see also [JS,J1])

7) Categorified DT invariants 2: perverse sheaves, after Kiem-Li (speakers : David & Tristan)
Main reference : [KL] (see also [JS,J1])

8) Motivic DT invariants 1, after Kontsevich-Soibelman, Joyce-Song, Reineke,... (speakers : Jonte & Shivang)
One can focus on the quiver case for simplicity.
References : [KS1,KS2,M]

Wednesday

9) Motivic DT invariants 2, after Kontsevich-Soibelman, Joyce-Song, Reineke,... (speakers : Jonte & Shivang)
References : [KS1,KS2,M]

10) Overview on the derived symplectic geometric approach to DT type invariants (speaker : Etienne)

$10^{3/4}$) Research talk (speaker : Ben), followed by a Gong show

Thursday

12) Intro to derived geometry. Relation with perfect obstruction theory and virtual counting (speaker : Carlo)
Reference : [STV]

13) shifted symplectic and lagrangian structures, with examples (speaker : Renata)
Main reference : [PTVV]

14) (-1)-shifted symplectic structures, with an emphasis on derived critical loci (and Darboux's lemma), and how they lead to symmetric obstruction theories and virtual critical manifolds in the sense of Kiem-Li (rather than Joyce's d-critical loci). If time permits, talk about (-2)-shifted symplectic structures (speaker : Joost)
References : [PTVV,V,J2,BBJ]

15) Research talk (speaker : Pierre)
Localization formulas for K-theoretic DT invariants : a derived approach

Friday

16) derived lagrangian foliations 1 : work in progress of Benjamin and Marco (speakers : Benjamin & Marco).

17) derived lagrangian foliations 2 : work in progress of Benjamin and Marco (speakers : Benjamin & Marco).

References

General references

[BF] Kai Behrend & Barbara Fantechi, The Intrinsic Normal Cone

[B] Kai Behrend, Donaldson-Thomas Type Invariants via Microlocal Geometry

[KL] Young-Hoon Kiem & Jun Li, Categorification of Donaldson-Thomas invariants via perverse sheaves

[T] Richard Thomas, A holomorphic Casson invariant for Calabi-Yau 3-folds, and bundles on K3 fibrations

Derived Algebraic Geometry

[BBJ] Christopher Brav, Vittoria Bussi & Dominic Joyce, A 'Darboux theorem' for derived schemes with shifted symplectic structure

[PTVV] Tony Pantev, Bertrand Toën, Michel Vaquié & Gabriele Vezzosi, Shifted Symplectic Structures

[STV] Timo Schürg, Bertrand Toën & Gabriele Vezzosi, Derived algebraic geometry, determinants of perfect complexes, and applications to obstruction theories for maps and complexes

[V] Gabriele Vezzosi, Basic structures on derived critical loci

DT in 4D

[CL] Yalong Cao & Naichung Conan Leung, Donaldson-Thomas theory for Calabi-Yau 4-folds

Joyce et al

[J1] Dominic Joyce, Generalized Donaldson-Thomas invariants

[J2] Dominic Joyce, A classical model for derived critical loci

[JS] Dominic Joyce & Yinan Song, A theory of generalized Donaldson-Thomas invariants

Kontsevich-Soibelman

[KS1] Maxim Kontsevich & Yan Soibelman, Stability structures, motivic Donaldson-Thomas invariants and cluster transformations

[KS2] Maxim Kontsevich & Yan Soibelman, Motivic Donaldson-Thomas invariants: summary of results

[M] Sven Meinhardt, An Introduction to (Motivic) Donaldson-Thomas Theory