

# **Advances In Homotopy Theory**

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## **Report of Contributions**

Contribution ID: 2

Type: **Invited research talk**

## Resolutions and duality in $K(2)$ -local homotopy theory

*Monday, 29 June 2015 11:00 (50 minutes)*

Some time ago, Goerss, Henn, Mahowald, and Rezk produced a topological resolution of the  $K(2)$ -local sphere at the prime 3. Along with the emergence of topological modular forms, this was one of the events that helped organize our thinking about the entire  $K(2)$ -local category. The occasion of this conference seems a good time to revisit these constructions and some of the theorems that followed, both new and old.

### Summary

**Primary author:** GOERSS, Paul (Northwestern)

**Presenter:** GOERSS, Paul (Northwestern)

Contribution ID: 3

Type: **Invited research talk**

## Characteristic classes in $TMF_0(3)$

*Monday, 29 June 2015 15:00 (50 minutes)*

We develop a theory of characteristic classes for the cohomology of topological modular forms with  $\Gamma_0(3)$ -level structures. These classes are supposed to play an important role in the determination of the string bordism ring. It turns out that the  $TMF_0(3)$ -cohomology of  $BString$  is freely generated by Pontryagin classes and one extra class which relates to the theory of cubical structures for line bundles on elliptic curves.

### Summary

**Primary author:** LAURES, Gerd (Bochum)

**Presenter:** LAURES, Gerd (Bochum)

Contribution ID: 4

Type: **Invited research talk**

## Around Takayasu's cofiber sequences

*Wednesday, 1 July 2015 12:00 (50 minutes)*

S. Takaysu introduced certain cofiber sequences which generalize the identification of a stunted infinite projective space with a certain Thom space. These sequences occur within the context of the Arone-Goodwillie tower for example. We will describe a new construction of these sequences. The construction uses certain properties of Lannes' T functor which will be discussed.

(joint work with Nguyen Dang Ho Hai)

### Summary

**Primary author:** SCHWARTZ, Lionel (Paris 13)

**Presenter:** SCHWARTZ, Lionel (Paris 13)

Contribution ID: 5

Type: **Invited research talk**

## The ring of cooperations for 2-primary tmf

*Wednesday, 1 July 2015 11:00 (50 minutes)*

This talk represents joint work with Kyle Ormsby, Nat Stapleton, and Vesna Stojanoska.

I will describe 3 different perspective on  $tmf\_tmf$  (localized at 2).

(1) the  $E_2$ -term of the Adams spectral sequence for  $tmf\_tmf$  decomposes as a direct sum of ext groups associated to bo-Brown-Gilter modules,

(2) modulo torsion,  $tmf\_tmf$  embeds into the ring of 2-variable modular forms, and

(3) modulo  $v_2$ -torsion,  $tmf\_tmf$  embeds into a product of  $TMF_0(N)_*$ , for various values of  $N$ , and how they are related.

### Summary

**Primary author:** BEHRENS, Mark (Notre Dame)

**Presenter:** BEHRENS, Mark (Notre Dame)

Contribution ID: 6

Type: **Invited research talk**

# **Automorphisms of p-completed classifying spaces of groups of Lie type**

*Tuesday, 30 June 2015 12:00 (50 minutes)*

(See PDF.)

## **Summary**

**Primary author:** OLIVER, Bob (Paris 13)

**Presenter:** OLIVER, Bob (Paris 13)

Contribution ID: 7

Type: **Invited research talk**

## Chromatic Gorenstein descent

*Wednesday, 1 July 2015 09:00 (50 minutes)*

It is elementary that  $ku$  (with coefficients  $Z[v]$ ) is Gorenstein of shift  $-3$ .

It follows that  $KU$  (with coefficients  $Z[v, 1/v]$ ) is Anderson self-dual (with shift one more) and by descent that  $ko$  is Gorenstein of shift  $-5$  and  $KO$  is Anderson self-dual (of shift one more).

There are a number of similar examples arising from topological modular (tmf(2), tmf(3)) and automorphic forms. The talk will describe the general context, how to predict the change in shifts under descent, and some particular cases (Joint work with Vesna Stojanoska).

### Summary

**Primary author:** GREENLEES, John (Sheffield)

**Presenter:** GREENLEES, John (Sheffield)

Contribution ID: 8

Type: **Invited research talk**

## **On some resolutions in the category $HV_{\{fg\}}-U$**

*Tuesday, 30 June 2015 16:30 (50 minutes)*

See PDF.

### **Summary**

**Primary author:** LANNES, Jean (Paris 7)

**Presenter:** LANNES, Jean (Paris 7)



Contribution ID: 9

Type: **Invited research talk**

## Invertible modules over higher real K-theory spectra

*Monday, 29 June 2015 12:00 (50 minutes)*

For a finite subgroup  $G$  of the Morava stabilizer group of height  $n$  at a prime  $p$ , there is an associated ring spectrum  $EO = (E_n)^{hG}$  of homotopy fixed points of Morava  $E$ -theory  $E_n$  under its  $G$ -action. The spectra  $EO$  carry some tractable information about the  $K(n)$ -local sphere. We study their Picard groups, and show that, when  $n=p-1$ ,  $\text{Pic}(EO)$  is always cyclic. This is joint work with Drew Heard and Akhil Mathew.

### Summary

**Primary author:** STOJANOSKA, Vesna (MPI Bonn)

**Presenter:** STOJANOSKA, Vesna (MPI Bonn)

Contribution ID: 10

Type: **Invited research talk**

## Calculating with power operations for Morava E-theory at height 2

*Monday, 29 June 2015 16:30 (50 minutes)*

There is a robust theory of power operations for Morava E-theory. At height 2, this theory is sufficiently robust to allow complete calculations. We provide some examples.

### Summary

**Primary author:** REZK, Charles (UIUC)

**Presenter:** REZK, Charles (UIUC)

Contribution ID: 11

Type: **Invited research talk**

## Group actions on rings and group cohomology

*Tuesday, 30 June 2015 09:00 (50 minutes)*

We consider a finite group  $G$  acting on a polynomial ring  $k[V]$  and try to understand the multiplicity of a given indecomposable  $kG$ -summand in terms of commutative algebra. We then try and do the same for cohomology of a group, considering it as a Mackey functor on the subgroups of  $G$ .

### Summary

**Primary author:** SYMONDS, Peter (Manchester)

**Presenter:** SYMONDS, Peter (Manchester)

Contribution ID: 12

Type: **Invited research talk**

# Homology of functors from groups to abelian groups

*Tuesday, 30 June 2015 11:00 (50 minutes)*

Functor homology (i.e. homological algebra in functor categories) on a suitable category allow us to compute some stable homology of linear groups, orthogonal groups or symplectic groups with twisted coefficients.

Little is known concerning stable homology of automorphism groups of free groups with twisted coefficients. We have cancellation results, several computations in small degree by Satoh and explicit classes constructed by Kawazumi. Homology of functors from groups to abelian groups should help us to better understand stable homology of automorphism groups of free groups with twisted coefficients.

In this talk, I will explain the previous motivation for the study of homology of functors from groups to abelian groups and I will give several results concerning this functor homology.

## Summary

**Primary author:** VESPA, Christine (Strasbourg)

**Presenter:** VESPA, Christine (Strasbourg)

Contribution ID: 13

Type: **Invited research talk**

## **Descent up to nilpotence in equivariant stable homotopy theory**

*Tuesday, 30 June 2015 15:00 (50 minutes)*

We will report on joint work (partially in progress) with Akhil Mathew and Justin Noel about descent in an equivariant context. This allows to revisit and extend various classical results of Quillen, Hopkins/Kuhn/Ravenel, and Thomason and leads to a number of interesting questions and conjectures.

### **Summary**

**Primary author:** NAUMANN, Niko (Regensburg)

**Presenter:** NAUMANN, Niko (Regensburg)