2

A. Salzburger (CERN)
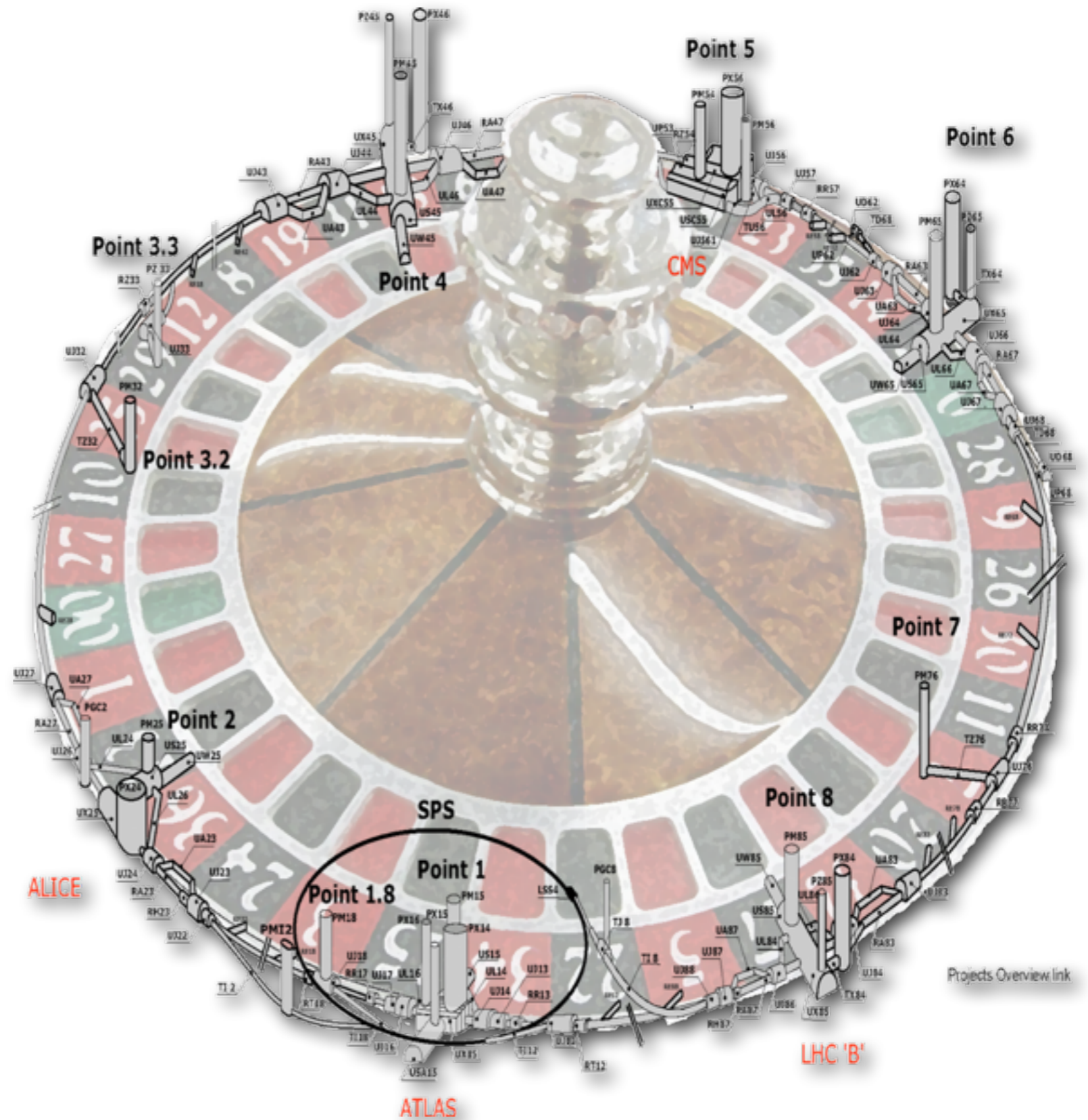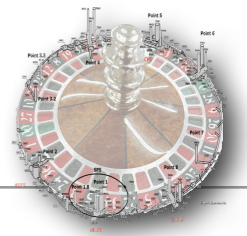
"Fast Detector Simulation in High Energy Physics"

DESY

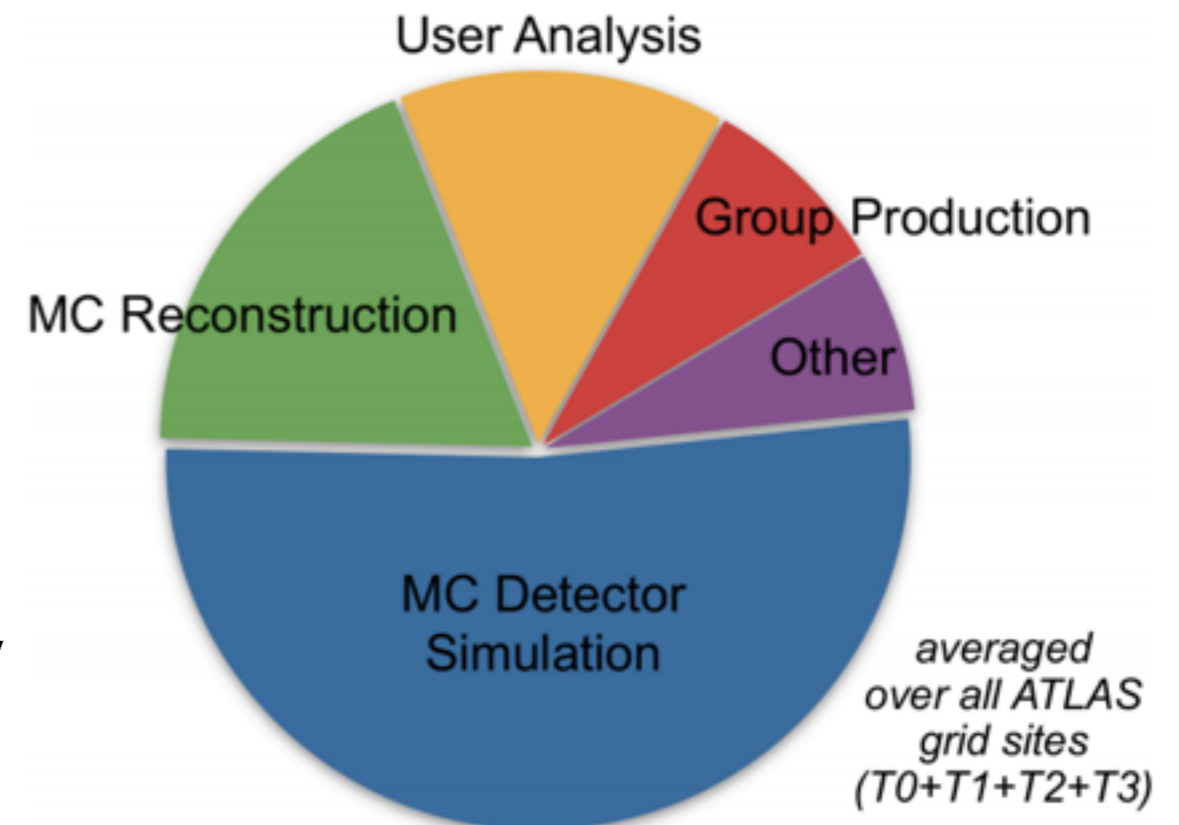15-17 January 2013 *Zeuthen*

Europe/Berlin timezone

2nd Fast Monte Carlo Workshop in HEP

DESY

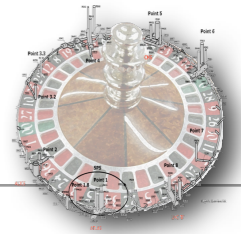14-16 Januar 2014 *DESY, Zeuthen*

Europe/Berlin timezone

‣ Expanded te scope a bit

- **not only detector simulation**
- let's call it **fast Monte Carlo** !

The problem of large scale MC production didn't solve itself magically in the meantime …

User Analysis

Group Production

MC Reconstruction

Other

MC Detector Simulation

averaged over all ATLAS grid sites (T0+T1+T2+T3)

++Participants

- Detector communities

    ALICE (new), ATLAS, Belle2 (new), CMS, ILC

- Simulation commities
  - Geant4 (new)
  - Delphes

- In total numbers (as of yesterday) …

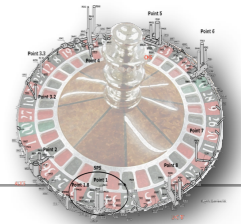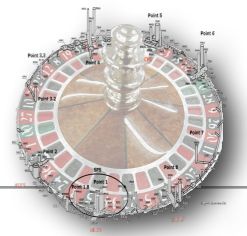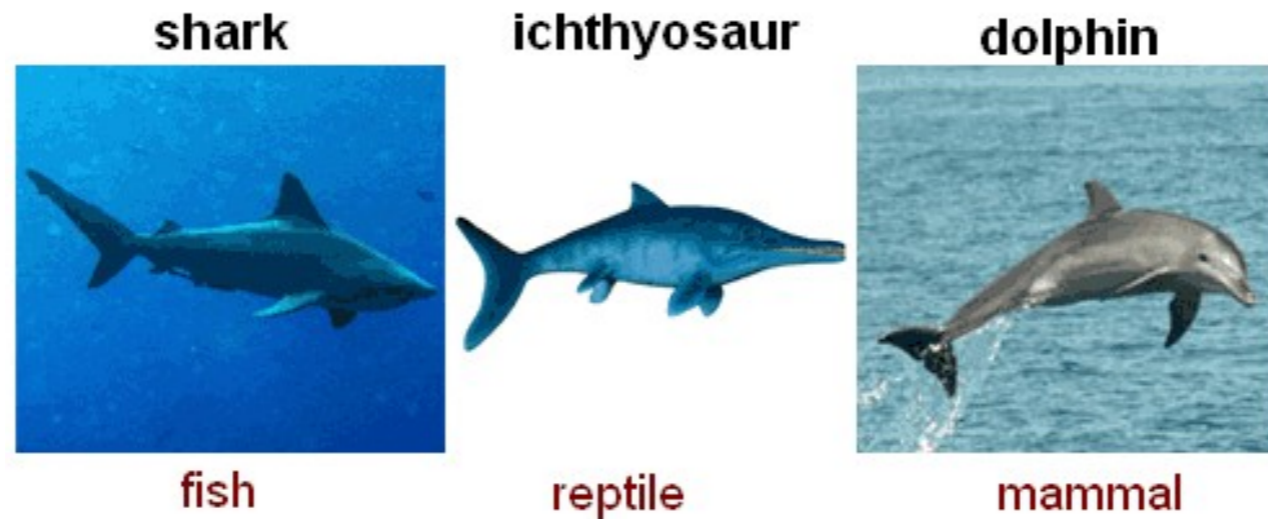Current registrants (32)

2014

Current registrants (30)

2013

… and new faces !
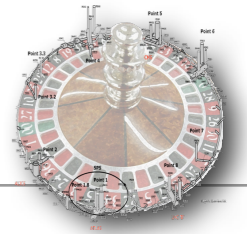
‣ Last year's workshop was a kick-off workshop

‣ **A main finding (not very surprising)**

Evolutionary convergence

shark — fish

ichthyosaur — reptile

dolphin — mammal

‣ But yet, there are differences …

Common tools exist, but you may want to reinvent the wheel anyway

...AND I HAVE FOUND THIS ONE WORKS A LOT BETTER.

- Delphes is a very popular tool among theorists nowadays (>100 citations; endorsed by LPCC); but use in experimental collaborations (even for future detectors, or upgrades) is limited by preference for a coherent output format between all simulation tools, even if this means reinventing the wheel several times

- But usage of Delphes simulation engine as an external library is possible

A year later …
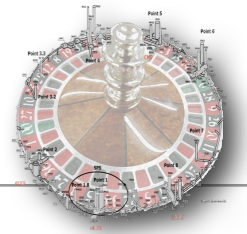
‣ Let's learn what happened in the meantime

 - what happened to ATLAS' Integrated Simulation Framework (ISF)
 - how is the CMS (fast) simulation progressing
 - common tools for upgrade simulation (ECFA campaign by ATLAS/CMS) ?
 - how is Delphes progressing/being used
 - interest is broadened: ALICE fast simulation ideas

‣ Let's be also pretty frank where we stand

 - despite the 'evolutionary divergence' - is there a fast simulation community ?
 - can we build one ?
 - and how can we interact more & more efficiently with Geant4 ?

… and a year wiser ?

The MC chain
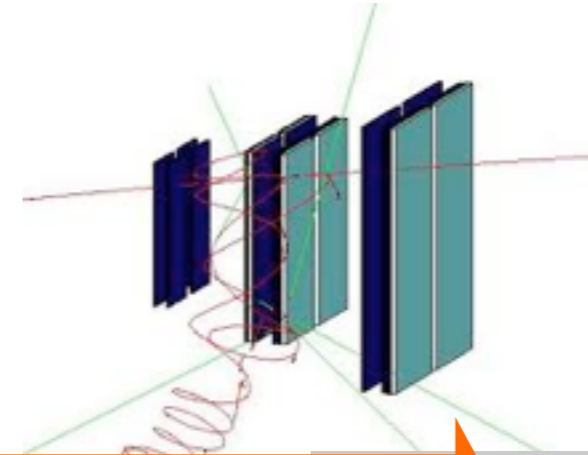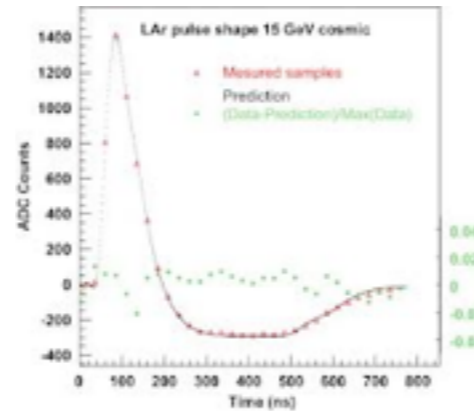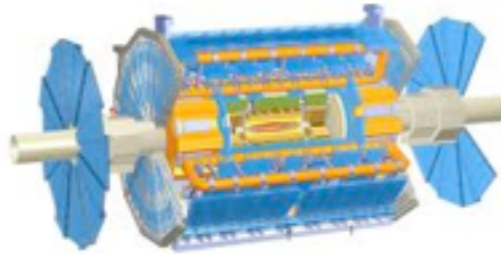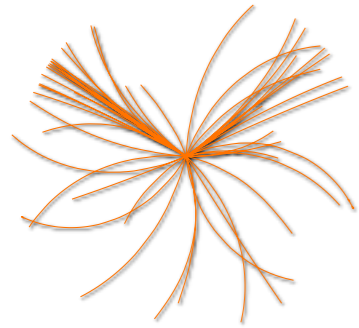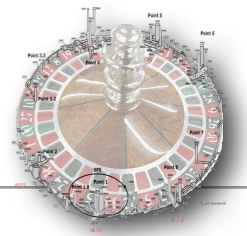
| Event Generation | Detector Simulation | Digitization | Reconstruction | Rootification |

- ‣ Of course there's also a big component of technical speed-up

  - computing infrastructure, new CPU architectures and software design (concurrency, drain model computing …)
  - although many of us may also be involved in that, this is not the main focus of the workshop … however, if you want to point something out, do it
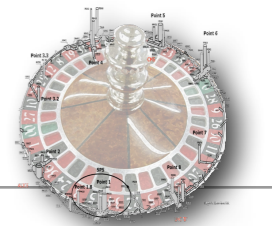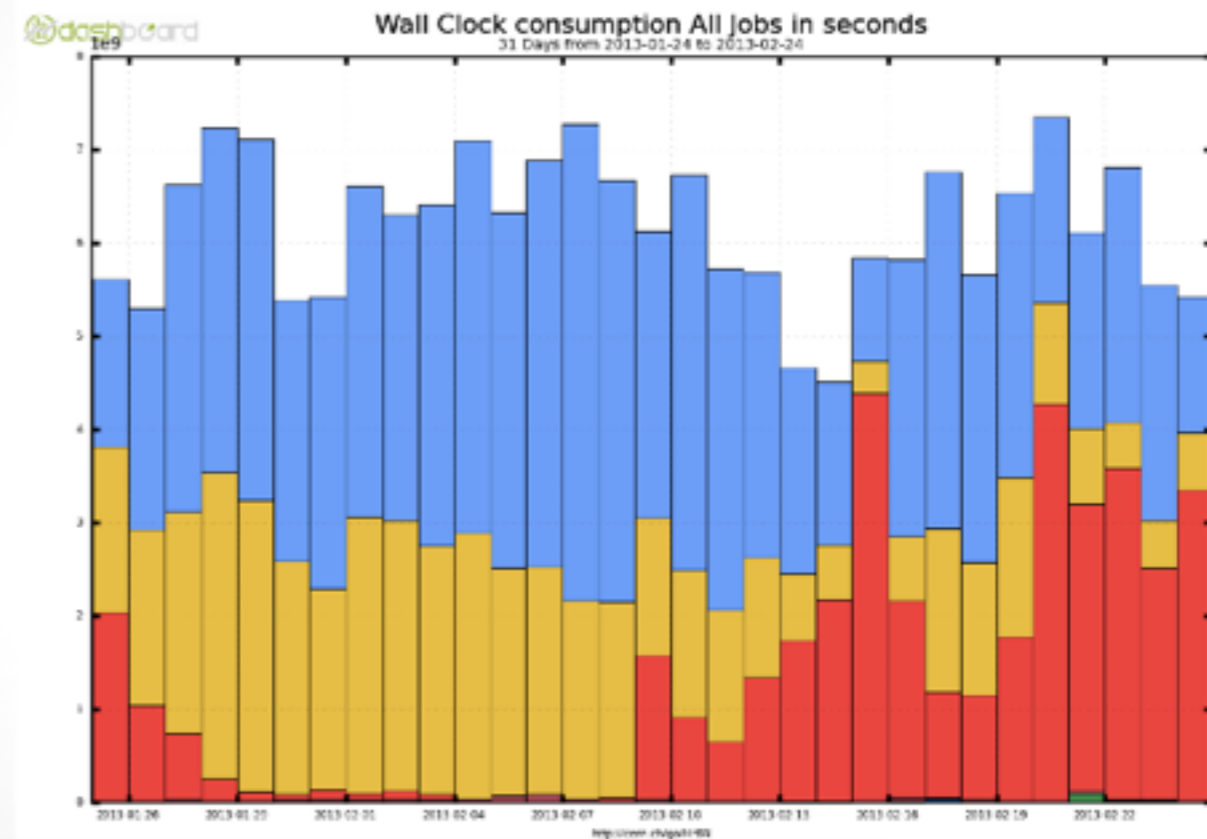
‣ Dedicated session on **Event Generation**

- it does take some significant amount of time
- for standard MC campaign $N(\text{evgen}) < N(\text{det. simulation})$
- upgrade/feasibility studies $N(\text{evgen}) \gg N(\text{det. simulation})$

(4/1 week)

simulation
50%/41%

digi+reco
28%/17%

evgen
21%/41%

Wall Clock consumption All Jobs in seconds
31 Days from 2013-01-24 to 2013-02-24

| 15:30 - 19:00	Fast Generator Session	
15:30	**Introduction and optimisation in LHAPDF6** *30'*	
	Speaker: Andy Buckley (University Glasgow)	
16:00	**Speed gains in MadGraph5_aMC@NLO** *30'*	
	Speaker: Rikkert Frederix (CERN)	
16:30	**MPI and integration speed in Sherpa** *30'*	
	Speaker: Frank Siegert (Freiburg)	
17:00	**Scaling of fast NLO virtual term integration in OpenLoops** *30'*	
	Speaker: Philipp Maierhoefer (Uni Zürich)	
17:30	**Speed issues and approaches in shower Monte Carlos** *30'*	
	Speaker: David Grellscheid (IPPP Durham)	
18:00	**Experiece of GPU speed up of MadWeight** *30'*	
	Speaker: Steve Lloyd (U Edinburgh)	
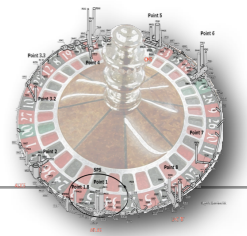
‣ you actually CAN PREDICT WHAT'S GOING TO HAPPEN

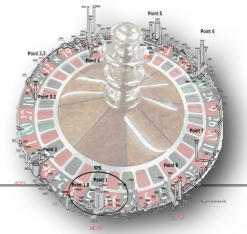**Brauhaus Lemke, Hackescher Markt, Mi 19:30 h**

See you next year!

It's all about style …

‣ This is a workshop

  - everybody who was attending last year certainly remembers the style

‣ It is not a conference

  - we will not tell if you showed an unapproved plot to illustrate something

‣ Please, interrupt, ask, interact

  - we do allow a lot of time for discussions in our agenda
  - and we should make use of it