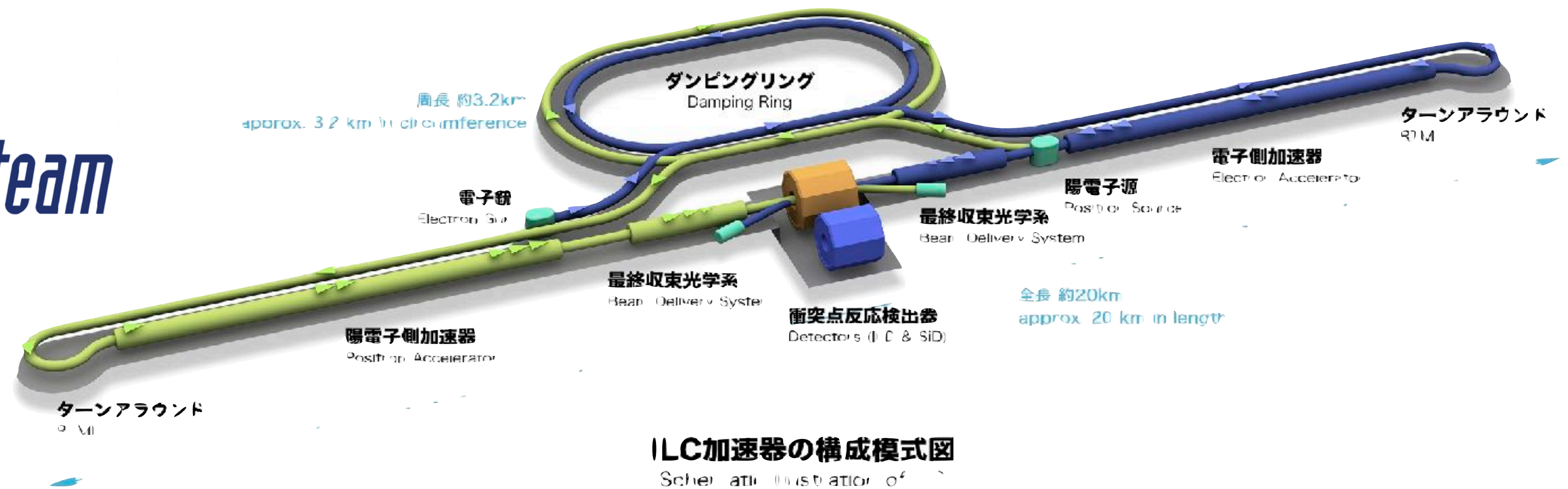


# IDT WG3 - Topical Group

## Modelling & Precision Theory

**ilc** international development team



Gudrun Heinrich - Stefan Höche - Li Zhao (李钊) - Jürgen Reuter

# WG3/Mod - Who are we and what do we want?



**Gudrun Heinrich, KIT**

- Precision calculations
- NNLO QCD / Multi-loop
- Higgs (+ heavy quarks)



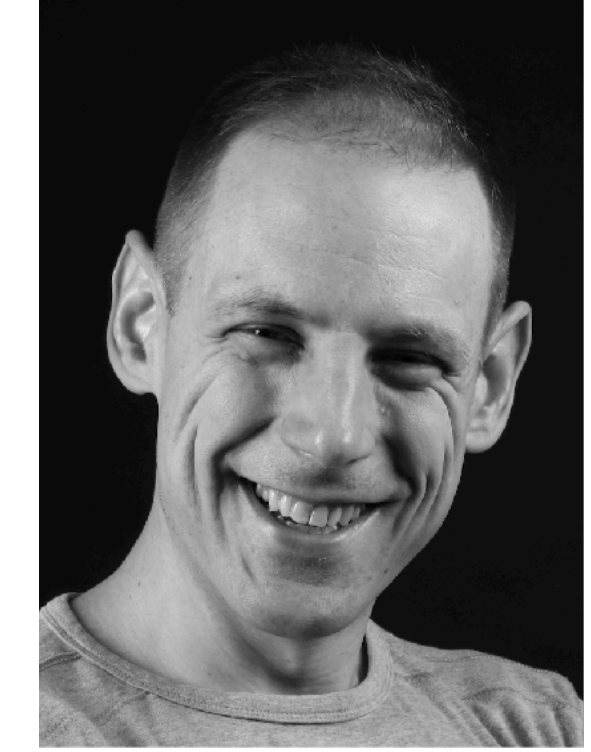
**Stefan Höche, FNAL**

- Perturbative QCD
- Jet physics
- Monte Carlo generators



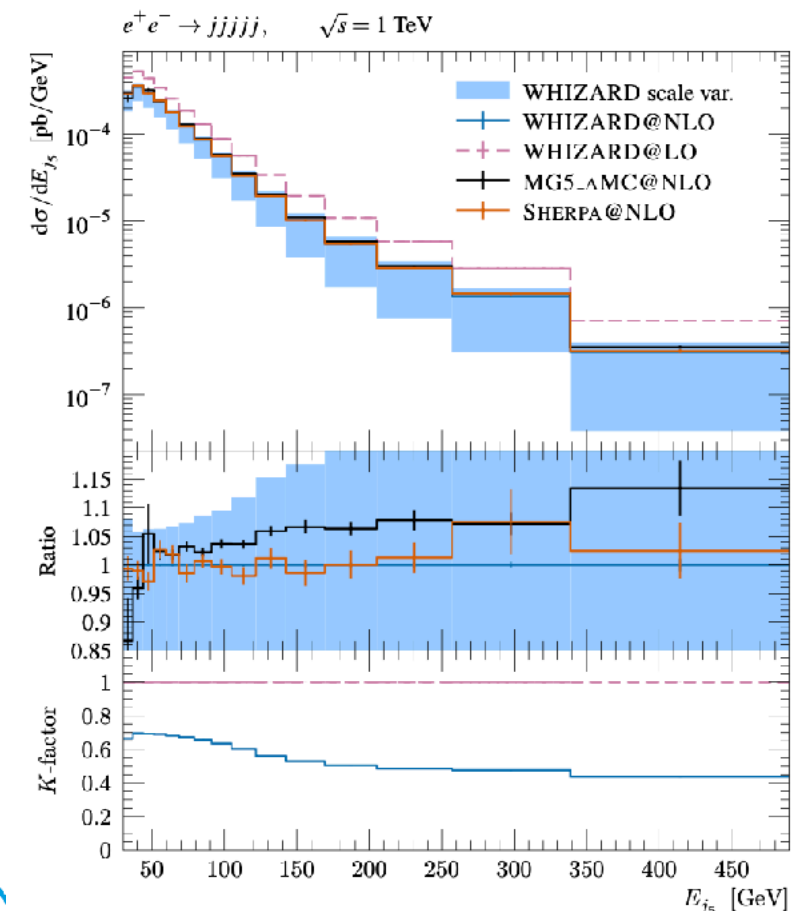
**Li Zhao (李钊), IHEP**

- (Non- &) Perturbative QCD
- Boosted objects
- Jet substructure



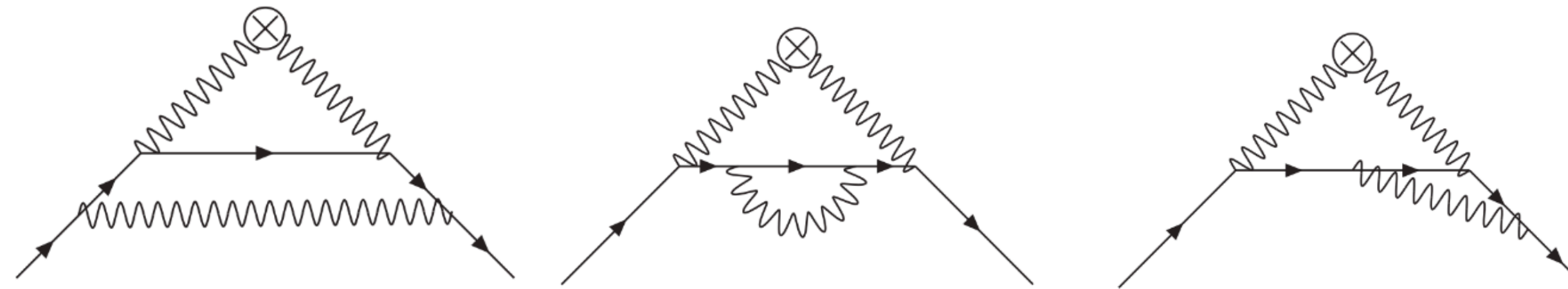
**Jürgen Reuter, DESY**

- EW physics
- BSM physics
- Monte Carlo generators

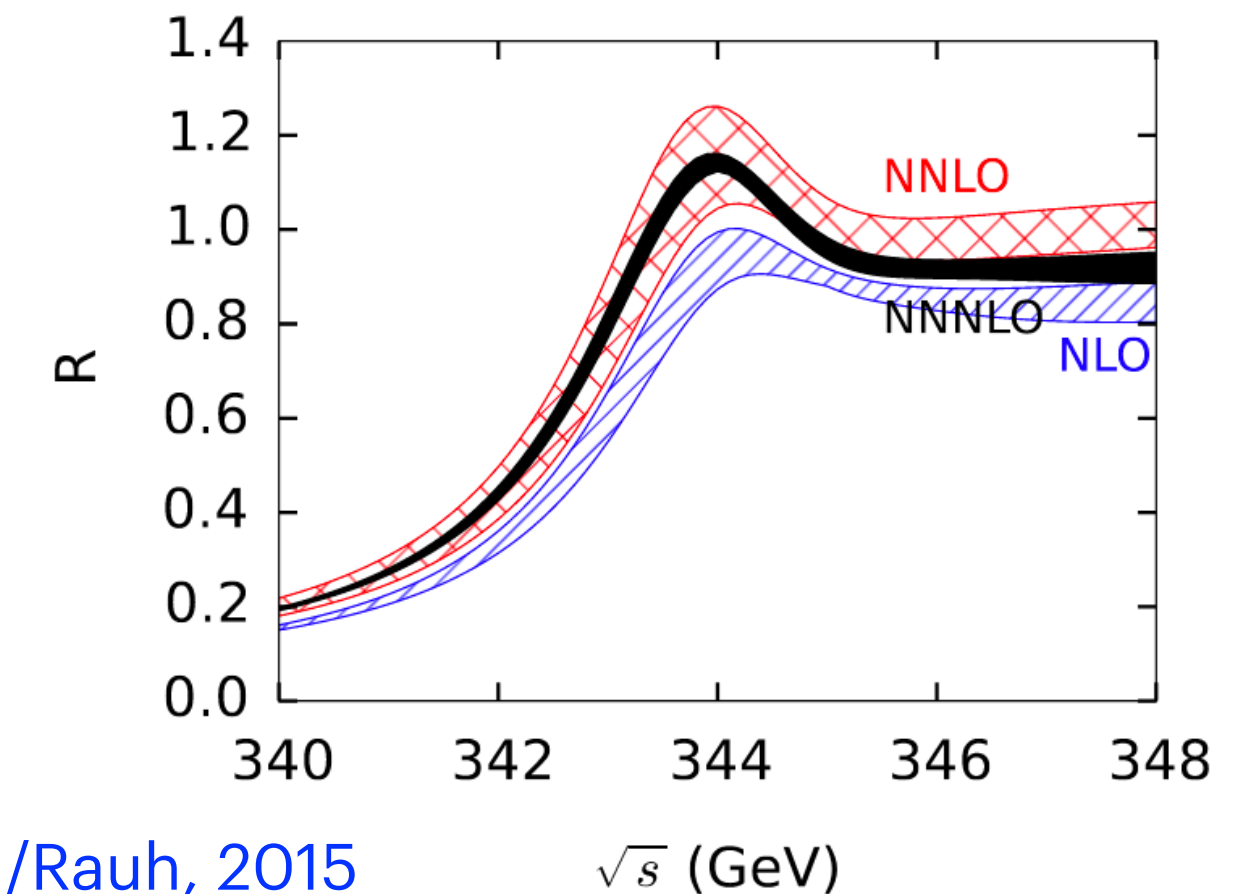


Rothe, 2021

J. R. Reuter, DESY



Ablinger/Blümlein/de Freitas/Schönwald, 2020



Beneke/Maier/Piclum/Rauh, 2015

IDT WG3 Virtual Kick-Off Meeting, 27.5.2021





# Physics & Scope, Connections to Topical Groups

## Precision Calculations for ILC

- NNLO QCD / EW / mixed
- Thresholds:  $Z$ ,  $WW$ ,  $Zh$ ,  $tt$ ,  $tth$
- New loop techniques
- QED resummation
- non-pert. QCD / fragmentation
- All-order QED factorization
- NLO SMEFT

## Monte Carlo implementation / studies

- YFS vs. collinear factorization
- Photon isolation
- MC tuning for ILC
- New MC techniques (ML, ...)
- Improvement on beam spectra
- Polarization in event formats
- Simulation of BSM / SMEFT

- Multi-Leg NLO QCD / EW / mixed
- QED resummation matched to MC
- QCD/EW shower and resonances
- QED matching schemes
- NNLO matching schemes
- Unfolding QED corrections

EW physics

Higgs properties

Top/Heavy Flavor/ QCD

Global interpretation

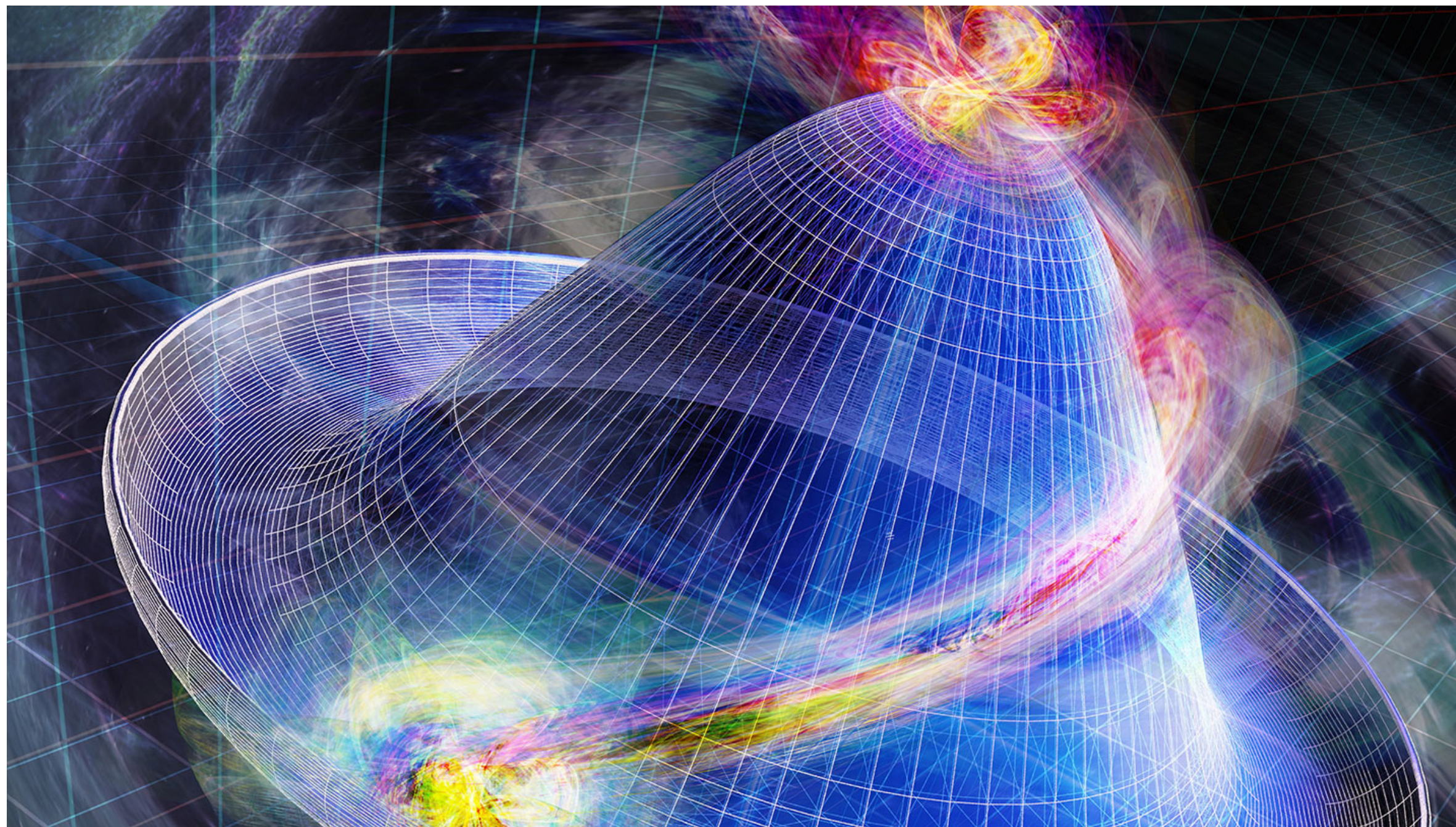
BSM production



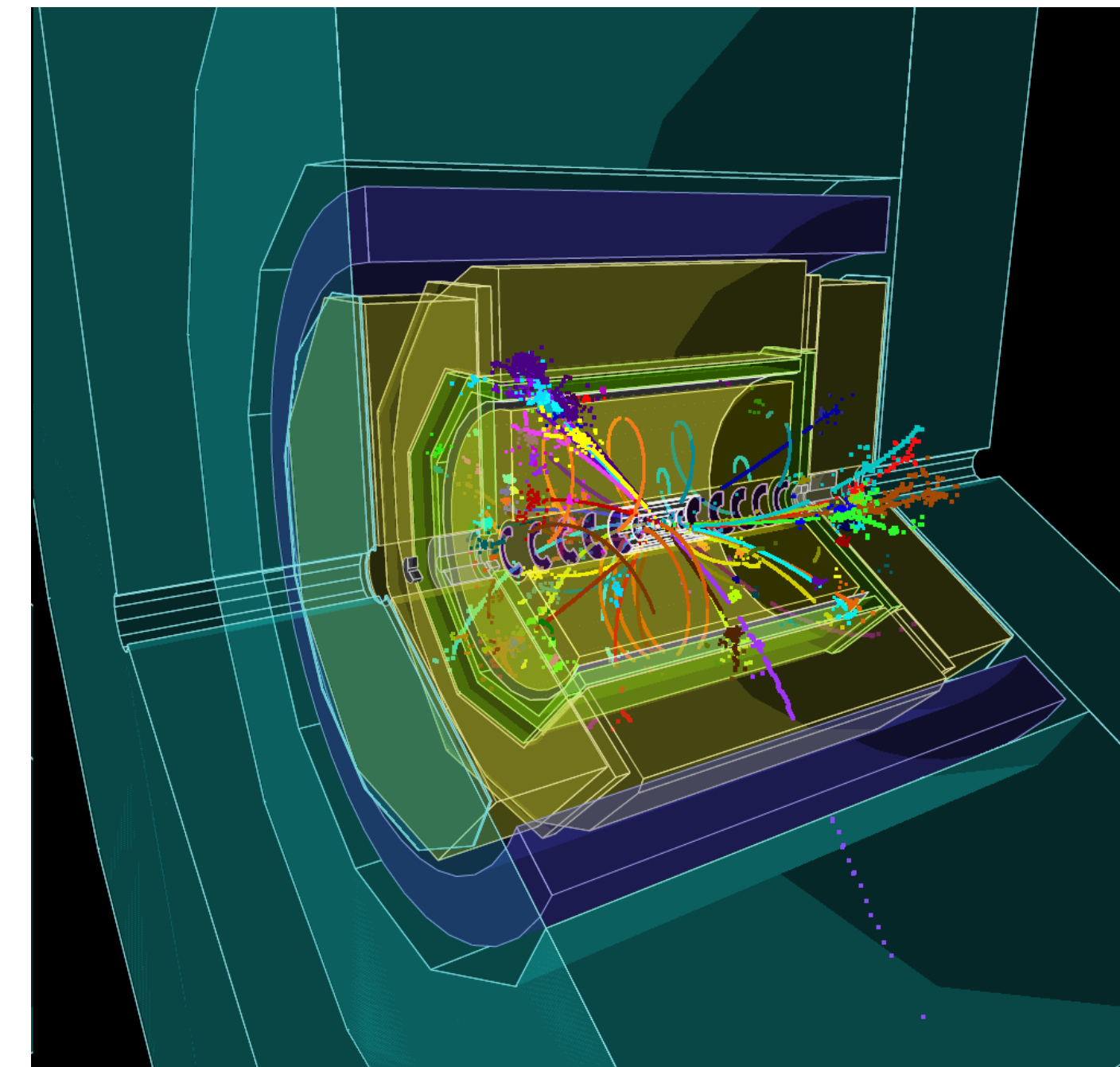


# Goals, next steps Invitation to Join & Collaborate

- Transferral of SLC/LEP legacy, smoothly enhancing existing ILC simulations (+ CLIC / CEPC)
- Identify need for improvement from theory + simulation
- Motivate people to work on ILC theory, precision & simulation
- Contacted large group of theorists and experimentalists this week, **hope for more (crowd sourcing)**
- **First Working Group Meeting: Thu, June 10, 2021 1700 hrs CERN time, 2400 hrs KEK time**



J. R. Reuter, DESY



ILD Event Display

IDT WG3 Virtual Kick-Off Meeting, 27.5.2021

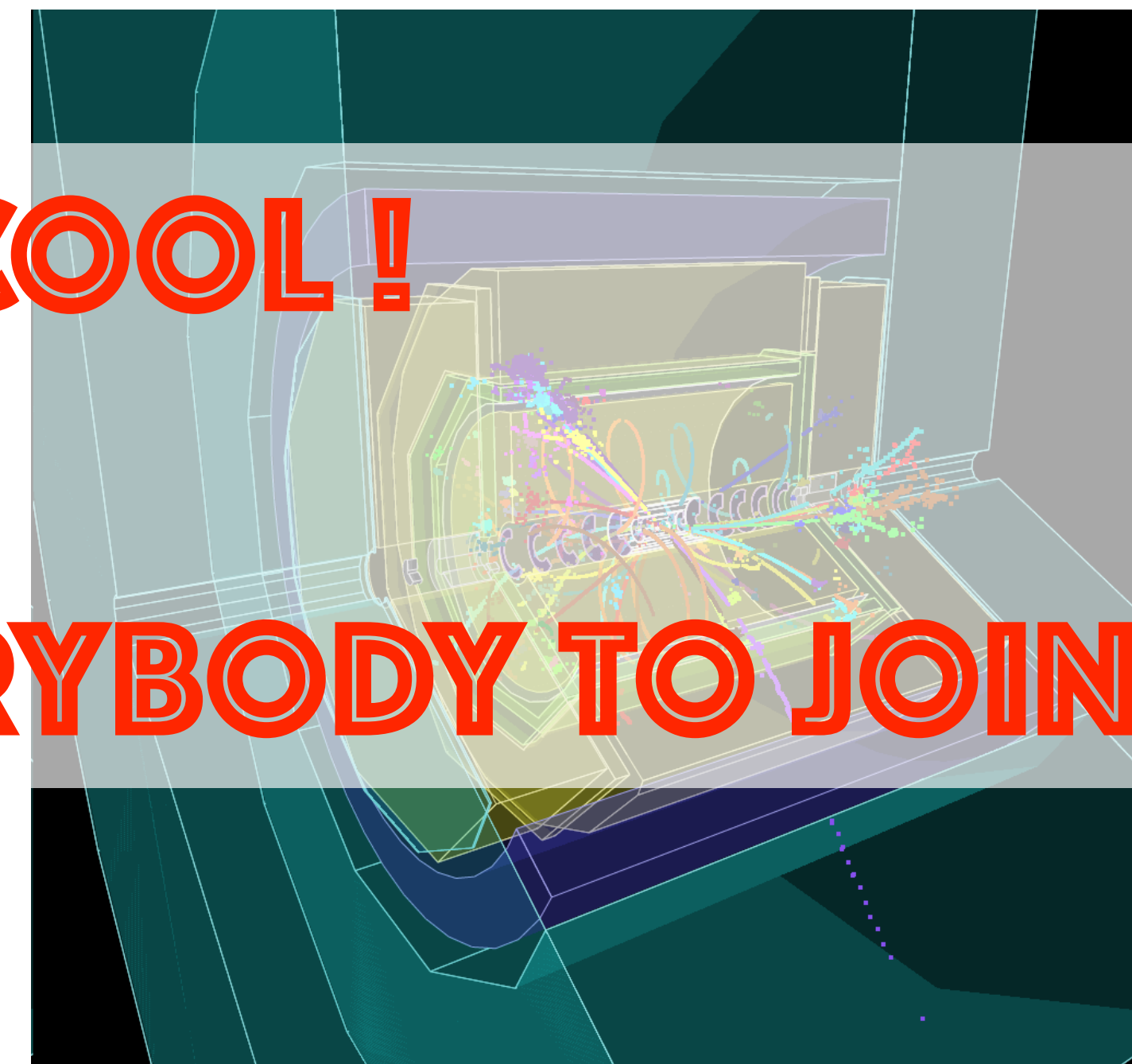


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**ILC PHYSICS IS COOL!**  
**WE WARMLY WELCOME EVERYBODY TO JOIN!!!**



ILD Event  
Display

Ritsch, ÖAW  
[Austrian  
Academy of  
Sciences]



J. R. Reuter, DESY

IDT WG3 Virtual Kick-Off Meeting, 27.5.2021