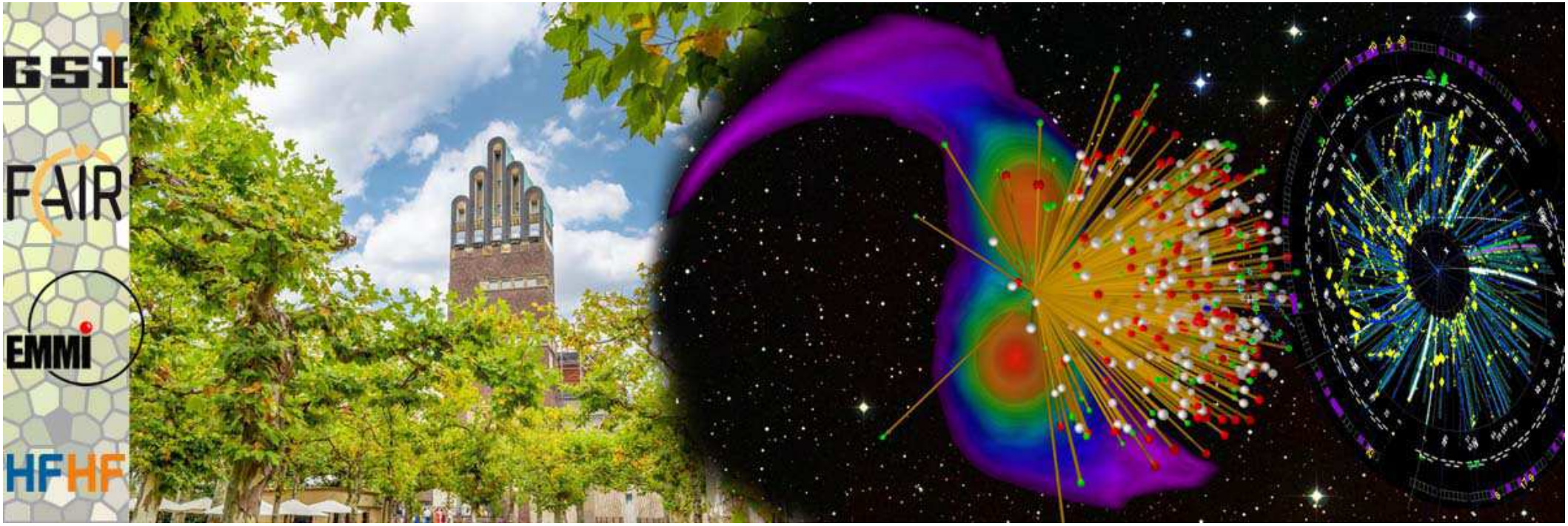

NuSym23, XIth International Symposium on Nuclear Symmetry Energy

18-22 September 2023

GSI Darmstadt, Germany

Important topic: Transport model simulations of heavy-ion reactions
thoughts about representation of this topic at NUSYM

Hermann Wolter

Talks about this topic at NUSYM23

Tuesday 19 September 2023

Transport model simulations of heavy-ion reactions - Main Lecture Hall (08:30-10:35)

-Conveners: Hannah Elfner

time	[id] title	presenter
08:30	[75] Transport Model Evaluation Project (TMEP): Status and Future Directions	WOLTER, Hermann
08:55	[68] Extracting the nuclear equation-of-state from heavy ion collisions with transport simulations	COLONNA, Maria
09:20	[64] Effects and relevance of off-shell transport	BRATKOVSKAYA, Elena
09:45	[9] Kinetic approach of light-nuclei production in intermediate-energy heavy-ion collisions	WANG, Rui
10:10	[49] Equation of state of nuclear matter from collective flows in intermediate energy heavy-ion collisions	COZMA, Dan

20+5 min

Transport model simulations of heavy-ion reactions: Parallel session (I) - Main Lecture Hall (12:05-12:55)

-Conveners: Maria Colonna

time	[id] title	presenter
12:05	[53] Searching for isospin drift sites in heavy dissipative nuclear systems	NAPOLITANI, Paolo
12:30	[76] Towards constraints on the Equation of State with SMASH	MOHS, Justin

15+5 min

Thursday 21 September 2023

Transport model simulations of heavy-ion reactions: Parallel session (I) - Main Lecture Hall (16:30-17:30)

-Conveners: Dan Cozma

time	[id] title	presenter
16:30	[45] When and where are clusters formed in expanding systems?	ONO, Akira
16:50	[18] Refinements of the transport models and the constraints on symmetry energy	ZHANG, Yingxun
17:10	[36] Impact of the momentum dependence of the neutron and proton potentials on pion production in heavy-ion collisions	IKENO, Natsumi

15+5 min

Friday 22 September 2023

International long-range plan round-table - Main Lecture Hall (08:30-10:00)

-Conveners: Arnaud Le Fevre; Yvonne Leifels

time	title	presenter
08:30	Astro multi-messenger, theory of compact stars, bayesian analysis	BAUSWEIN, Andreas MARGUERON, Jérôme DIETRICH, Tim
09:00	Nuclear theory	HEBELER, Kai
09:30	Nuclear structure, short-range correlations	TYPEL, Stefan AUMANN, Thomas ROCA-MAZA, Xavier

Coffee break - BK1 Aquarium (10:00-10:30)

International long-range plan round-table - Main Lecture Hall (10:30-12:00)

-Conveners: Arnaud Le Fevre; Yvonne Leifels

time	title	presenter
10:30	Heavy-ion collisions	LORENZ, Manuel LOPEZ, Olivier SENGER, Peter TRAUTMANN, Wolfgang
11:00	Future facilities and experiments	VERDE, Giuseppe SENGER, Peter CHAJECKI, Zbigniew
11:30	Transport models of heavy-ion collisions	SORENSEN, Agnieszka COZMA, Dan ELFNER, Hannah

Transport Model Evaluation Project - Main Lecture Hall (12:00-13:00)

-Conveners: Betty Tsang; Hermann Wolter; Maria Colonna

Lunch - Canteen (13:00-14:00)

Transport Model Evaluation Project - Main Lecture Hall (14:00-15:00)

-Conveners: Betty Tsang; Hermann Wolter; Maria Colonna

Round-table discussion: short presentations by the panelists and discussions between panel and with audience

TMEP session agenda to be fixed

Suggestions for TMEP sessions:

1st session (before lunch): reports on transport model studies, possible speakers:

a) Dan Cozma: box study with momentum-dependent mean fields and threshold effects

b) somebody from studies at HADES, RHIC energies,

e.g. author of paper Reichert et al., J. Phys. G 49 (2022) 055108

Comparison of heavy ion transport simulations: Ag + Ag collisions at $E_{lab} = 1.58A$ GeV

Tom Reichert[1,2,*], Alexander Elz[1], Taesoo Song[3], Gabriele Coci[3], Michael Winn[4], Elena Bratkovskaya[1,2,3], Jörg Aichelin[4,5], Jan Steinheimer[5] and Marcus Bleicher[1,2,3,6]

and/or somebody working with SMASH: Mohs, Elfner, Sorensen

2nd session (after lunch): discussion of future projects

some ideas:

a) test of HIC with realistic ingredients (mom-dep potentials (effecive masses, n-p mass splitting), threshold effects)

a combination of pion HIC and box study;

sensitivity study of typical observables (n/p ratio, pi-/pi+ ratio) to stiffness of SE

b) uncertainty quantification of transport model results

uncertainty of one code from Bayesian analysis, but

model dependence? (BAND (Bayesian Analysis for Nuclear Dynamics) project?)

c) role of fluctuations in transport simulations

main difference between QMD and BUU approaches

QMD classical correlations smeared by wp width vs. BUU deterministic -> include fluctuations explicitely (BL)

d) description of cluster production (esp. light clusters LC) in transport:

diff. forms of coalescence (a-posteriori) vs. dynamical cluster production, influences other observables (e.g. pion prod.)

e) production of strange particle producton.

e.g. K0/K+ which should be more sensitive to high-density region and less sensitive to final state effects

(continued on next page)

2nd session (after lunch): discussion of future projects (continued)

f1) implementation of microscopic input for the density functional and the in-medium cross sections
into transport codes,
e.g. from Dirac-Brueckner calculations or from chiral EFT. This is also a check of these theories at higher density

f2) implementation of EoSs from meta-modelling into transport codes
include constraints from nuclear structure into these priors, e.g. well defined limits on S_0 and L

g) Short-Range-Correlations (SRC) in transport (established in structure, lead to a high-momentum-tail (HMT)
should be important in transport studies, but how to include?
(initialization with HMT, change of the density functional, 3-particle scattering terms, off-shell dynamics?)

To do:
- select topic(s)

- find persons, who think about formulating specifications (homework),
  present this at NUSYM,
  and are (possibly) willing to lead the study

- not just compare any codes, but require
  qualifications and openness to code development