

# Snowmass2021 Lol for SIS Physics

## Draft organizers

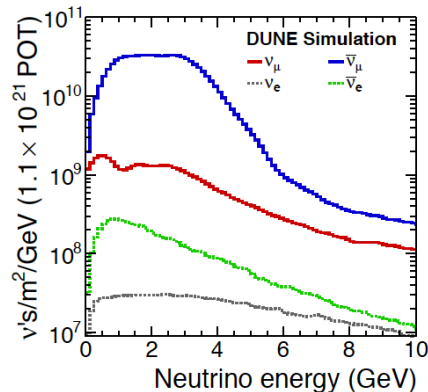
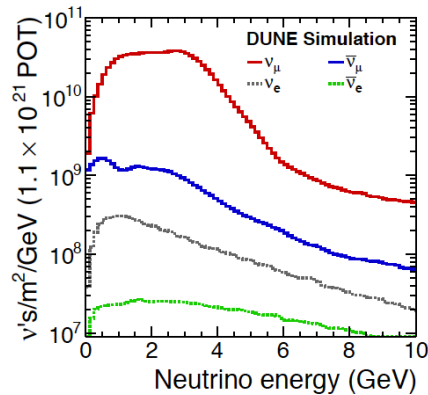
- Luis Alvarez Ruso (co-spokesperson, IFIC, Valencia, Spain)
- Mohammad Sajjad Athar (Aligarh Muslim University, Aligarh, India)
- Natalie Jachowicz (Ghent University, Ghent, Belgium)
- Toru Sato (Osaka, University, Osaka, Japan)
- Christoph Bronner (ICRR, Univ. Tokyo, Japan)
- Steve Dytman (University of Pittsburgh, Pittsburgh, PA, USA)
- Teppei Katori (King's College London, UK)
- Jorge G. Morfin (Fermilab, IL, USA)
- Jonathan Paley (co-spokesperson, Fermilab, IL, USA)

Teppei Katori  
King's College London  
NuSTEC meeting, July 8, 2020

# SIS physics

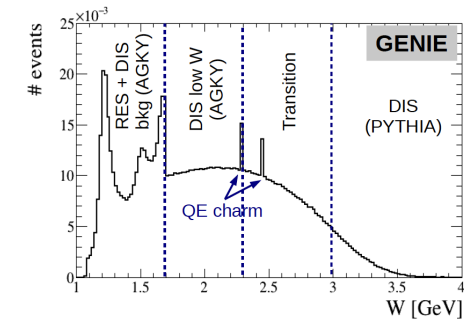
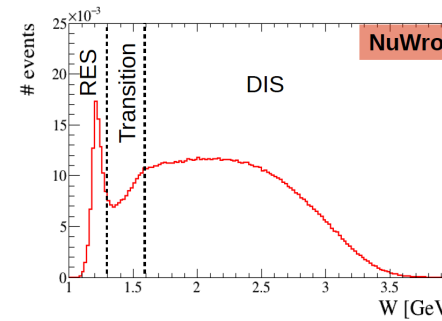
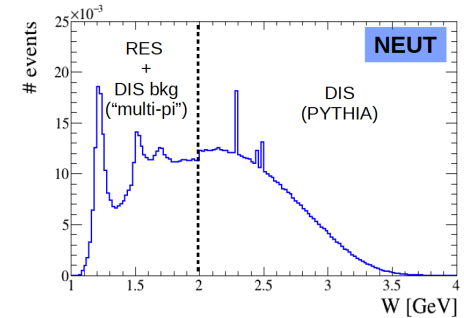
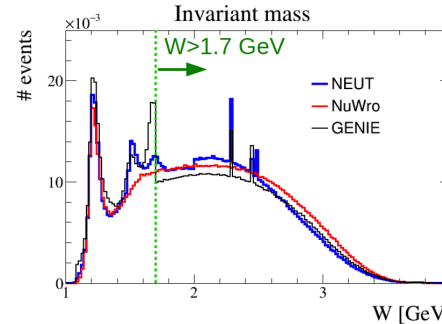
## Shallow-inelastic scattering

- Bottleneck of all neutrino generators
- cross-section modeling (resonance to DIS) and hadronization modeling (low  $W$  to high  $W$ )
- Theoretical understanding is also poor
- More important in future



## Invariant mass distribution

$\nu_\mu$  on Fe,  $E_\nu=6.0$  GeV



NuSTEC SIS workshop (Oct. 11-13 2018), L'Aquila, Italy

<https://nustec.fnal.gov/nuSDIS18/>

Summary paper (<https://arxiv.org/abs/1907.13252>)

2018 October 11-13

Gran Sasso Science Institute, Italy



**$\nu$ S&DIS workshop**

Neutrino Shallow- and Deep-  
inelastic Scattering workshop



[nustec.fnal.gov/nuSDIS18](https://nustec.fnal.gov/nuSDIS18)

katori@fnal.gov

2020/07/08

2

# SIS physics Lol for the Snowmass2021

I got the main idea from CEvNS Lol. There are few core authors, but they also invite anyone to contribute, or “sign-in” to support CEvNS. The Lol describes importance of CEvNS physics and not about any projects.

<https://www.snowmass21.org/docs/files/summaries/NF/SNOWMASS21-NF0-002.pdf>

Can we write a Lol on SIS physics for the Snowmass2021? In the Lol, we state current status and ongoing problems.

However, in the white paper (July 31, 2021 deadline), I think we will propose “something”

Support certain projects and/or programs

- Neutrino-hydrogen scattering experiment
- Neutrino factory (NuSTORM)
- JLab experiments (e4nu)
- Neutrino generator development
- Fermilab-JLab joint program to improve nuxsec models

So far...

9 core draft writers are identified. I think at least all board members are welcome to write drafts. Then I may invite more people to write and/or sign-in (TBA)