

# Snowmass21 White paper status: neutrino SIS and DIS

## Topics

1. Inelastic processes
2. Quark-Hadron duality
3. DIS in the Nuclear Environment
4. Hadronization
5. Path forward: Theoretical challenges
6. Path forward: Experimental challenges
7. Path forward: Generator challenges

## Snowmass Lol,

<https://arxiv.org/abs/2009.04285>

## SIS workshop (2018)

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

## Snowmass 2021 LoI:

### Neutrino-induced Shallow- and Deep-Inelastic Scattering

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NuSTEC board meeting, Dec. 7, 2021

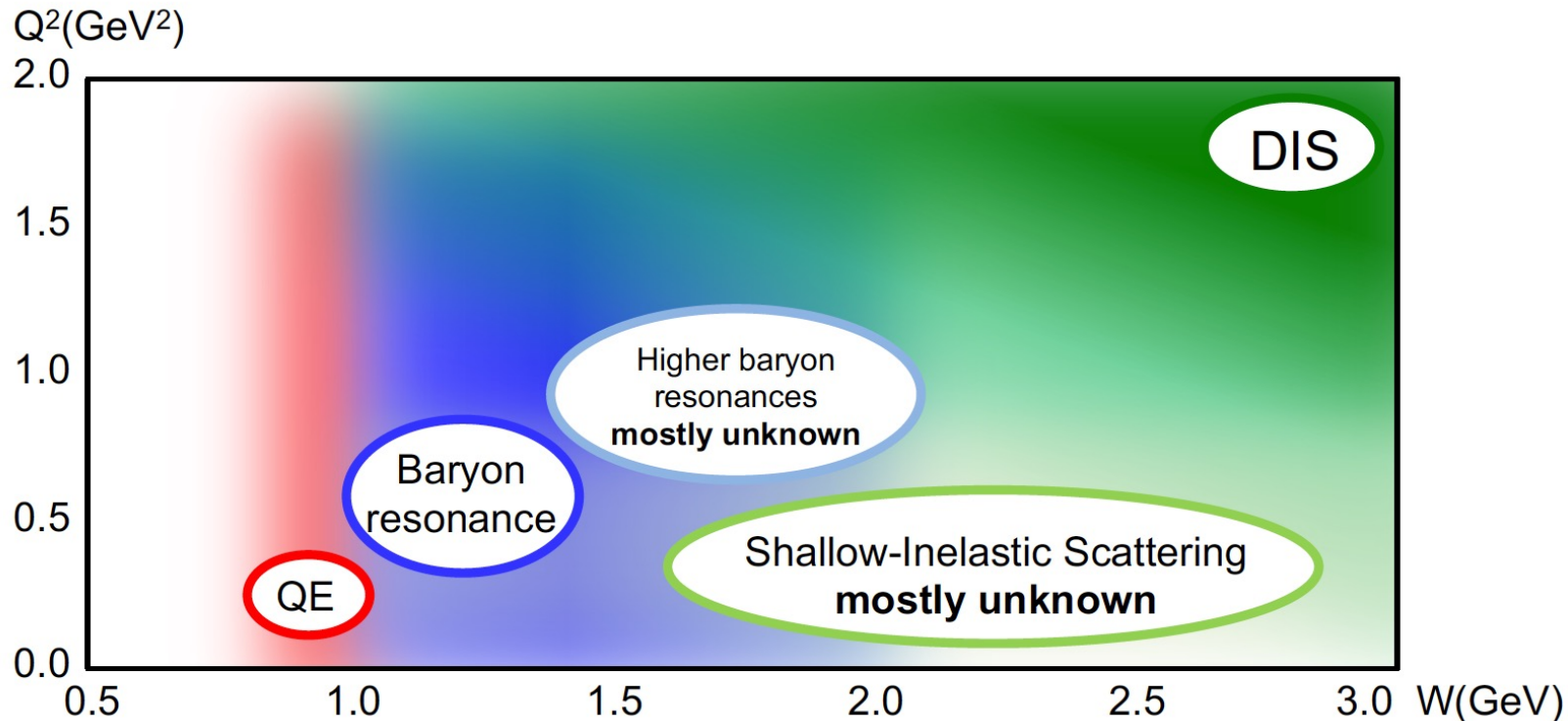
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## What is Shallow Inelastic Scattering (SIS)?

- Shallow  $\rightarrow$  low  $Q^2$  ( $<1\text{GeV}^2$ )
- Inelastic  $\rightarrow$  high  $W$  ( $>m_p+m_\pi$ )



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During Summer 2021, we asked Lol authors about the white paper contribution, and 23 people responded to contribute to the white paper

## What is Shallow Inelastic Scattering (SIS)?

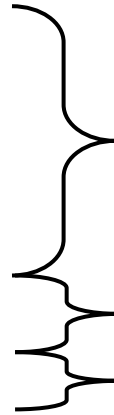
- Shallow  $\rightarrow$  low  $Q^2$  ( $<1\text{GeV}^2$ )
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| email                            | first name | last name  | institution        | 1. inelastic | 2. duality | 3. nucl. DIS | 4. hadroniz | 5. path - theo | 6. path - expt | 7. path- gen |
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| 23 norrick@fnal.gov              | Anne       | Norrick    | Fermilab           | 1            | 0          | 1            | 1           | 0              | 1              | 1            |
| total                            |            |            |                    | 10           | 6          | 9            | 6           | 10             | 9              | 10           |

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Neutrino interaction theory WP  
(SIS section contact: Natalie)

Many experimental WPs,  
H/D scattering WP

Neutrino interaction generator WP

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Do we need more WP(s)?

Other white papers plan go ahead, and the SIS white paper resources are split, I don't think it's bad thing

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## NuSTEC WP idea

- Summary of many effort AFTER the Snowmass21
- Not to cover everything
- Concise to cover “what we need”
  - example: What is missing for XXX, what we need for XXX (XXX=QEL, RES, DIS, etc)