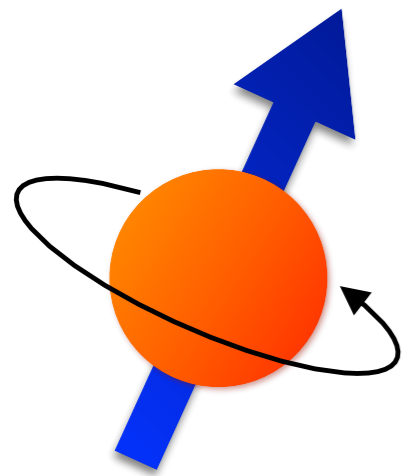


# The Muon $g-2$ Theory Initiative: Introduction

 Aida X. El-Khadra   
University of Illinois

(On behalf of the Steering Committee)



Muon  $g-2$  Theory Initiative workshop  
in Memoriam of Simon Eidelman

KEK and Nagoya University  
28 June - 02 July 2021

# Simon Eidelman (1948-2021)

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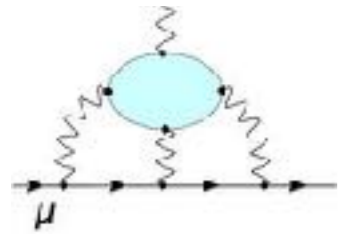
A pioneer of the field, a wonderful colleague, and a friend

# Muon $g-2$ Theory Initiative

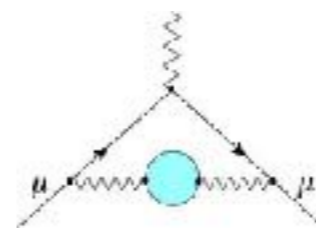
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- Maximize the impact of the Fermilab and J-PARC experiments
  - ▮ quantify and reduce the theoretical uncertainties on the hadronic corrections
- Summarize the theory status and assess reliability of uncertainty estimates
- Organize workshops to bring the different communities together:
  - [First plenary workshop @ Fermilab: 3-6 June 2017](#)
  - [HVP workshop @ KEK: 12-14 February 2018](#)
  - [HLbL workshop @ U Connecticut: 12-14 March 2018](#)
  - [Second plenary workshop @ HIM \(Mainz\): 18-22 June 2018](#)
  - [Third plenary workshop @ INT \(Seattle\): 9-13 September 2019](#)
  - [Lattice HVP at high precision workshop \(virtual\): 16-20 November 2020](#)
  - [Fourth plenary workshop @ KEK: 28 June - 02 July 2021](#)
- [White Paper](#) posted 10 June 2020:
  - [T. Aoyama et al, [arXiv:2006.04822](#), Phys. Repts. 887 (2020) 1-166.]
  - 132 authors, 82 institutions, 21 countries
- [Website](https://muon-gm2-theory.illinois.edu): <https://muon-gm2-theory.illinois.edu>

# White Paper summary (+ updates)



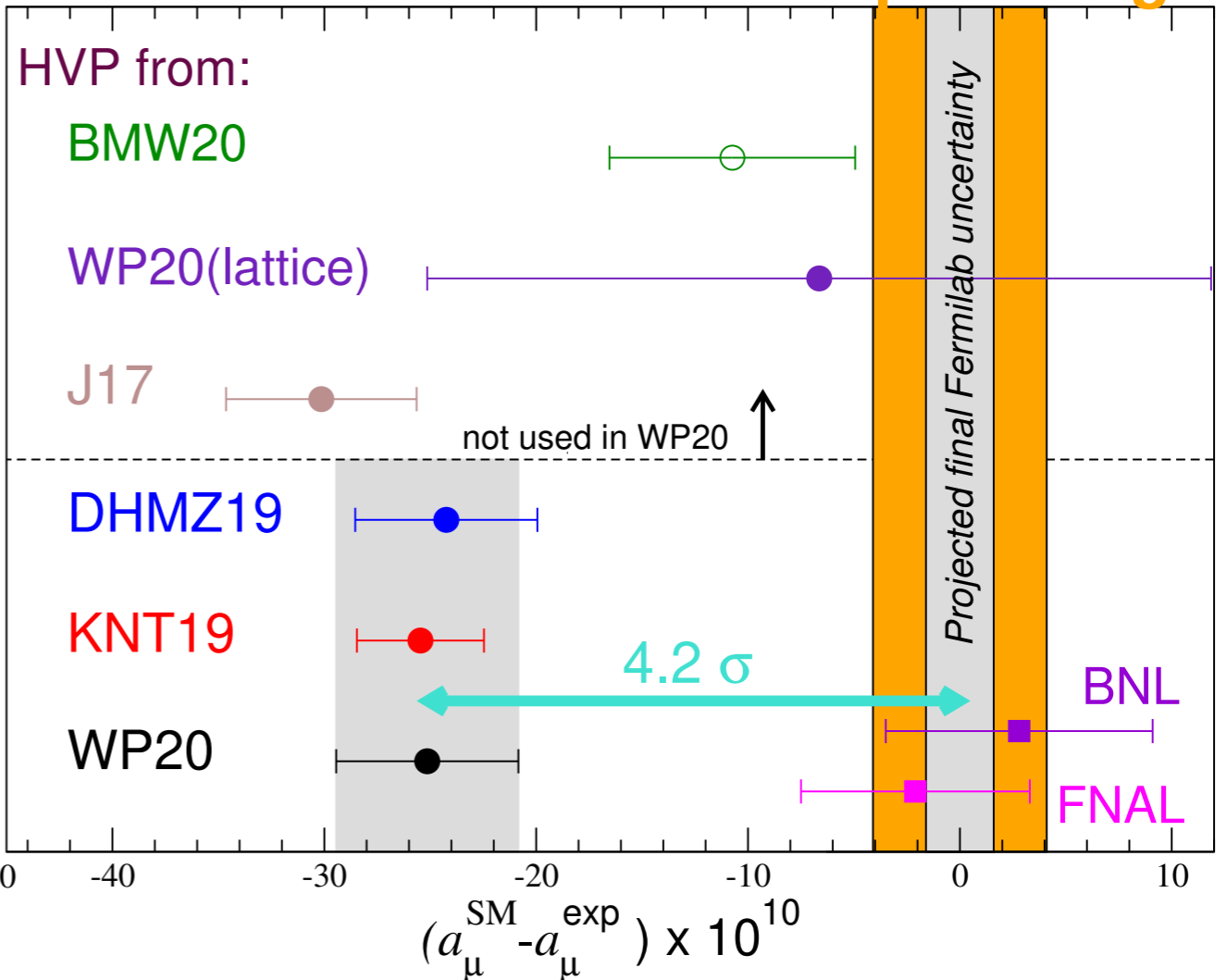
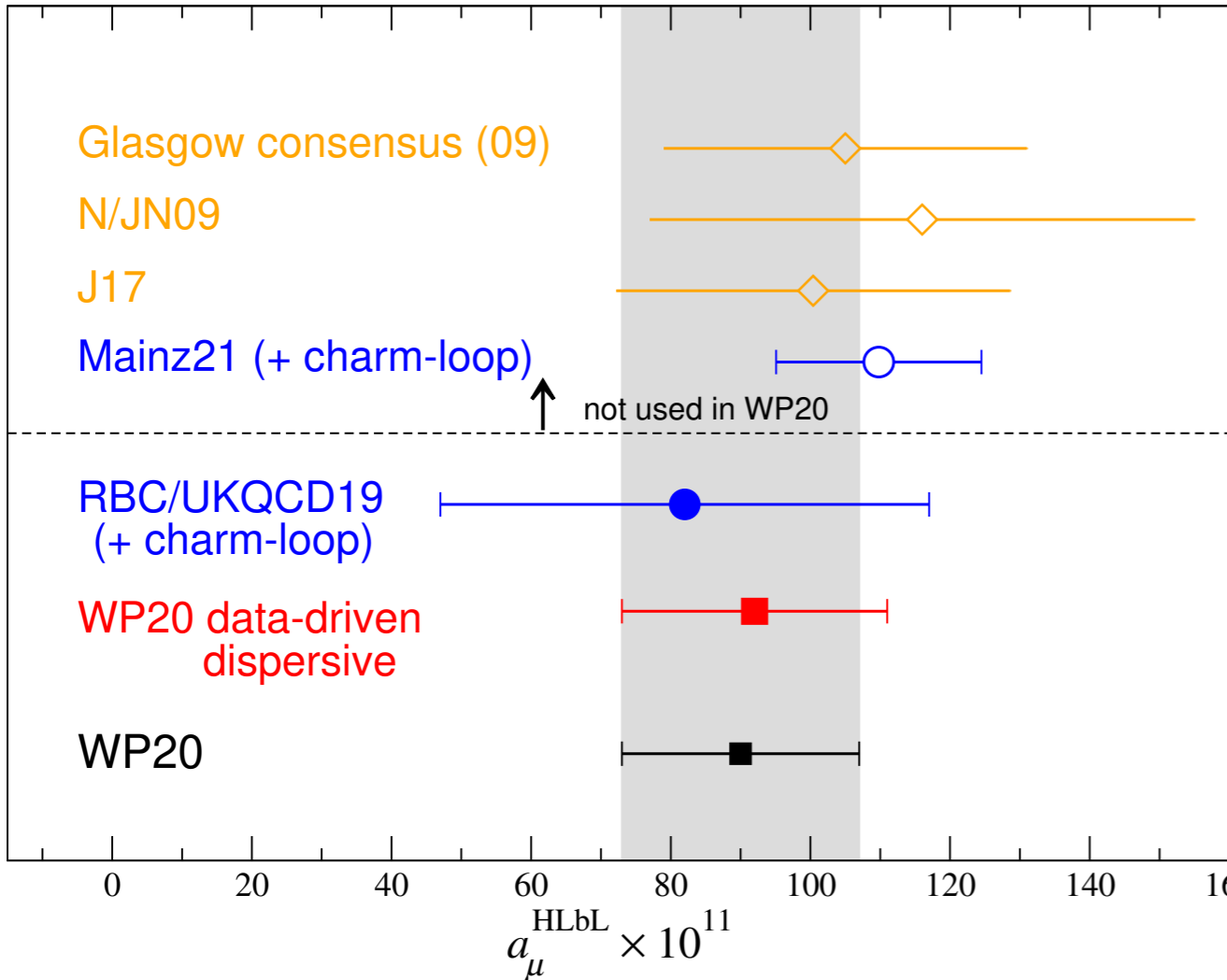
$$a_{\mu}^{\text{HLbL}}$$



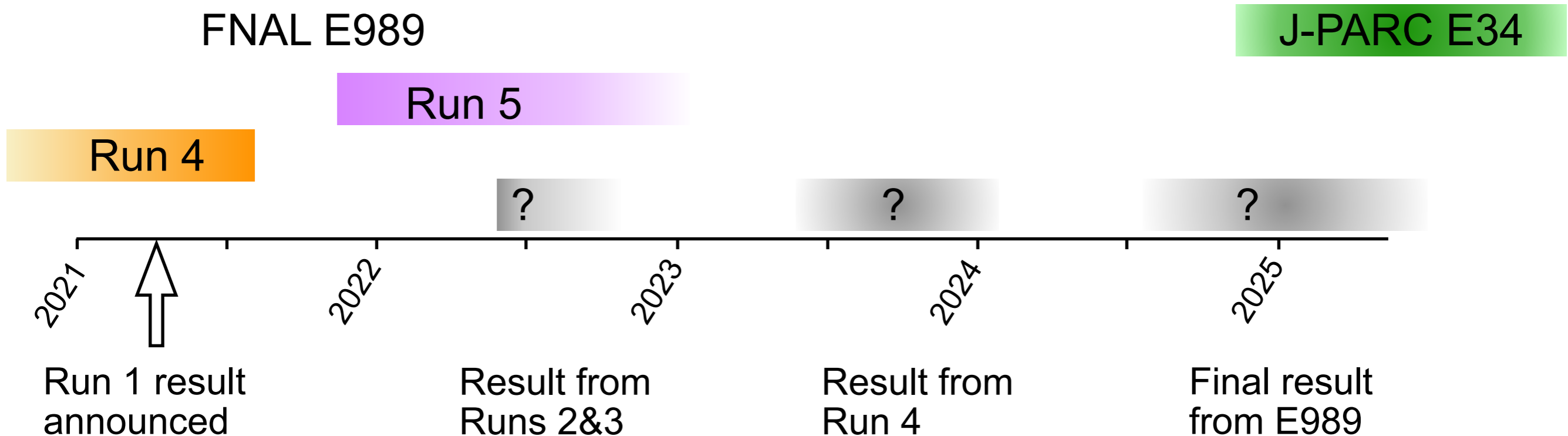
$$a_{\mu}^{\text{SM}}$$

$$a_{\mu}^{\text{HVP}} + [a_{\mu}^{\text{QED}} + a_{\mu}^{\text{Weak}} + a_{\mu}^{\text{HLbL}}]$$

Exp. average



# Timeline of g-2 experiments



- The Fermilab and J-PARC g-2 experiments will yield increasingly precise measurements of  $a_\mu$  through the rest of this decade.
- In addition, future efforts may include negative muon runs at Fermilab and new muon EDM experiments.
- ➡ Continue efforts to improve on the precision of the SM predictions.
- ➡ Theory Initiative: plan to continue efforts and update WP with new SM predictions

# Muon $g-2$ Theory Initiative

## Steering Committee



- Gilberto Colangelo (Bern)
- Michel Davier (Orsay)
- Simon Eidelman (Novosibirsk)
- Aida El-Khadra (UIUC & Fermilab)
- Martin Hoferichter (Bern)
- Christoph Lehner (Regensburg University & BNL)
- Laurent Lellouch (Marseille)
- Tsutomu Mibe (KEK) J-PARC Muon  $g-2$ /EDM experiment
- Lee Roberts (Boston) Fermilab Muon  $g-2$  experiment
- Thomas Teubner (Liverpool)
- Hartmut Wittig (Mainz)

# Muon $g-2$ Theory Initiative

## Steering Committee

### Tasks are:

- Planning and organization of workshops
- Editorial board for WPs
- Long-term planning and coordination with  $g-2$  experiments

### Changes:

- Chair: Aida El-Khadra
- 2 co-chairs: [Michel Davier](#) and [Christoph Lehner](#)
- New members (since completion of first WP):
  - [Martin Hoferichter](#) (joined June 2020)
  - [Hartmut Wittig](#) (joined July 2020)
  - [Laurent Lellouch](#) (joined June 2021)

# Muon g-2 Theory Initiative

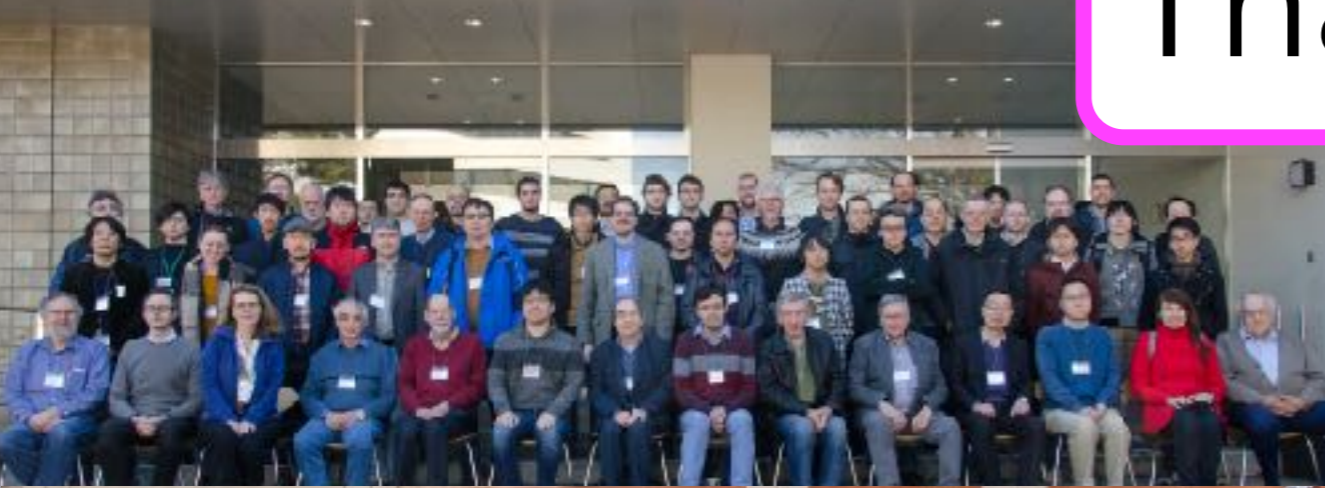
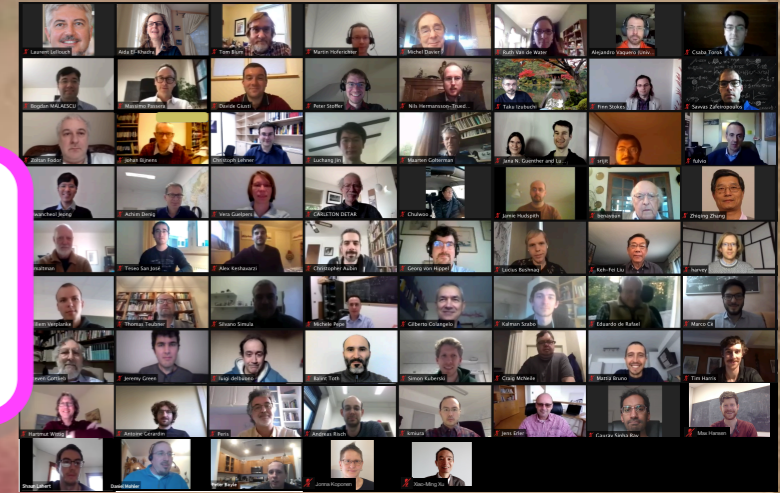
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- Participation and membership is open to everyone who is interested in contributing.
- If interested , **please sign up for the mailing list** ([muon-gm2-theory@fnal.gov](mailto:muon-gm2-theory@fnal.gov))
  1. send an email message to [listserv@fnal.gov](mailto:listserv@fnal.gov)
  2. leave the Subject line blank
  3. in the body of the message type:  
SUBSCRIBE MUON-GM2-THEORY [Firstname] [Lastname]
  4. If you need help please send email to [axk@illinois.edu](mailto:axk@illinois.edu)
- **This workshop**: start planning for WP update
- **2022**: plenary workshop in Europe  
If needed, also a topical workshop or a meeting focused on WP update
- **2023**: plenary workshop in Japan
- **Feedback on the TI**, past and future, activities and organization:  
use Slack workspace for comments and discussion  
[#future-of-theory-initiative](https://muong2theoryi-clp2688.slack.com)





Thank you!





UNIVERSITY of WASHINGTON



Thank you!

