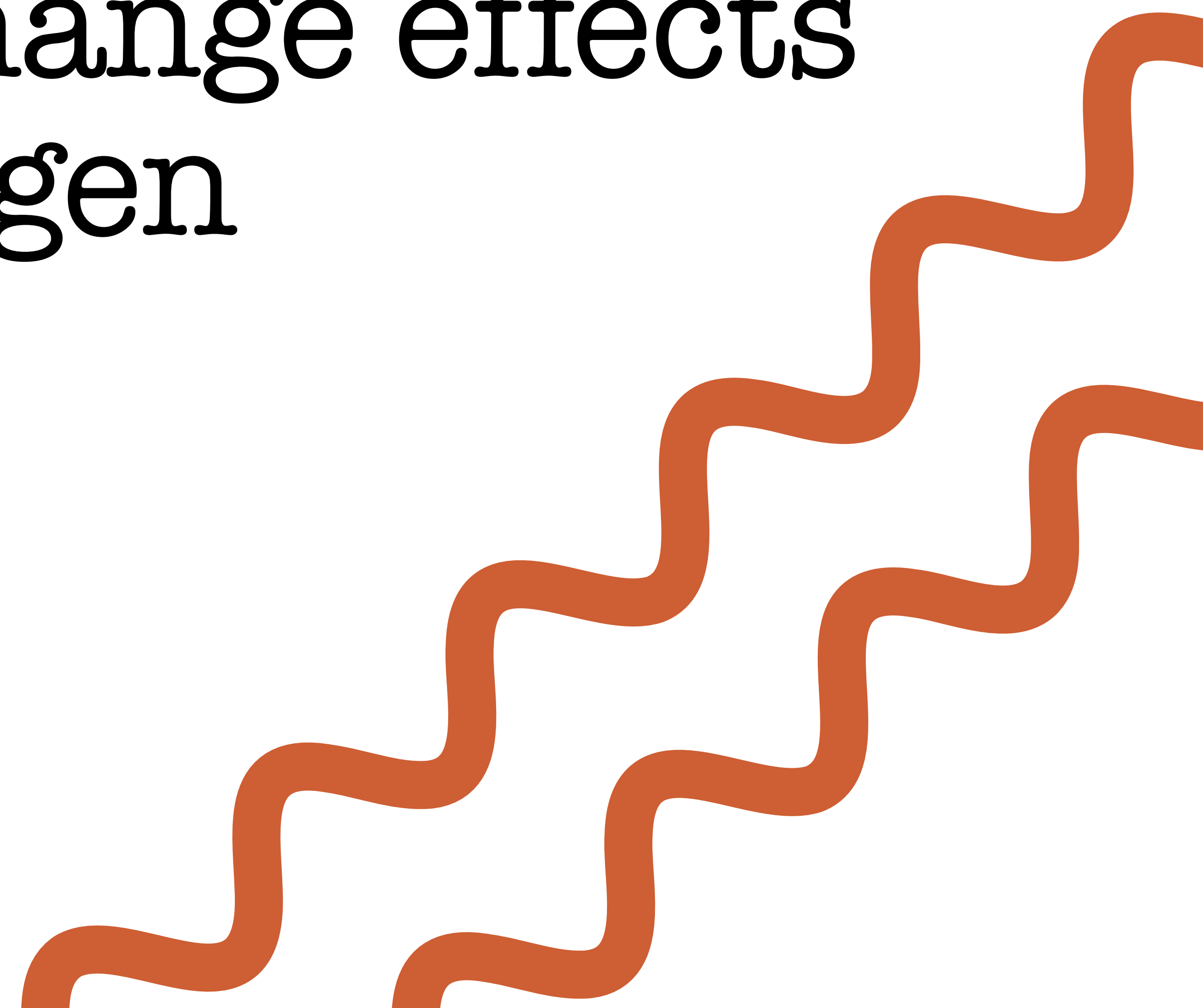


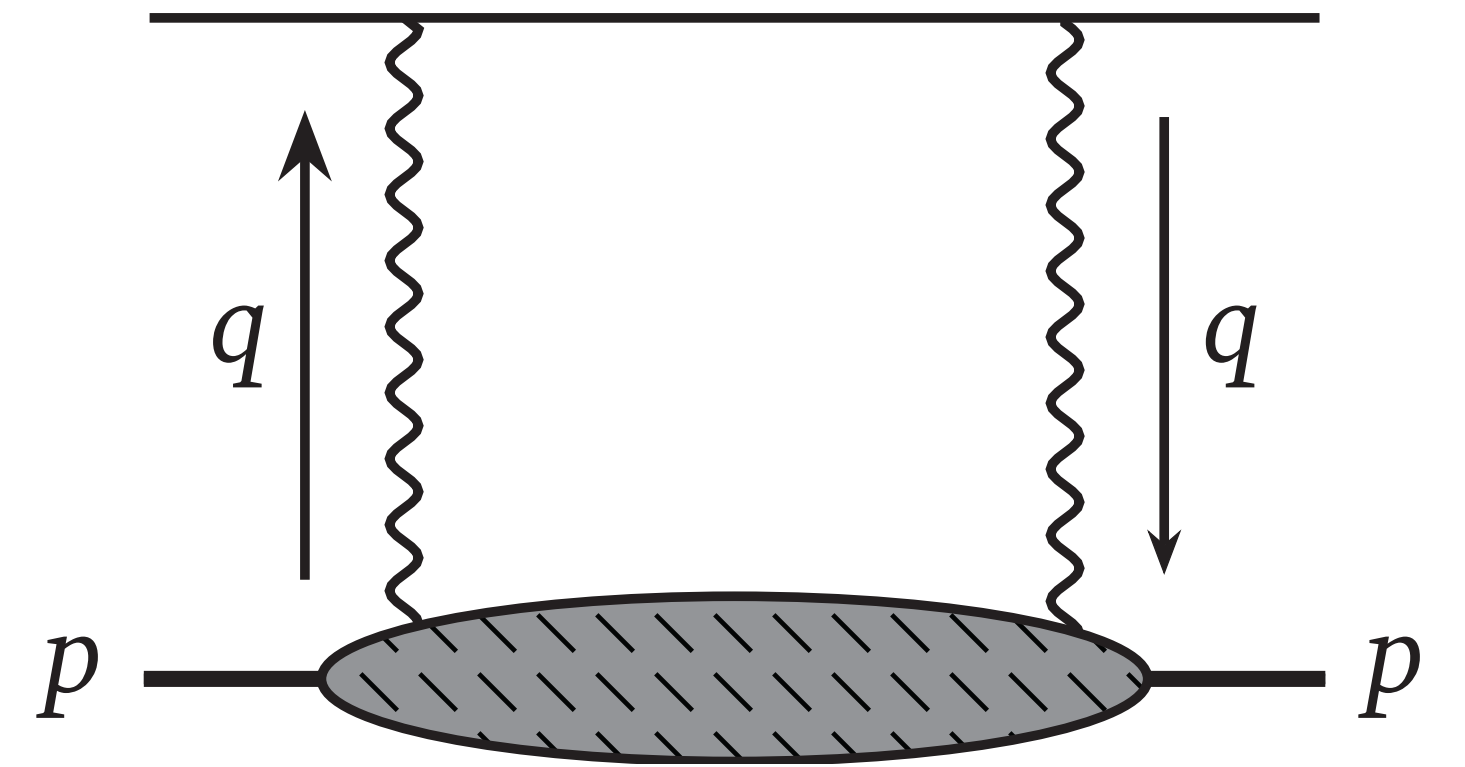
# Two Photon Exchange effects in muonic hydrogen

Author: Panagiotis Kalamidas

Supervisor: Prof. Dr. Marc Vanderhaeghen

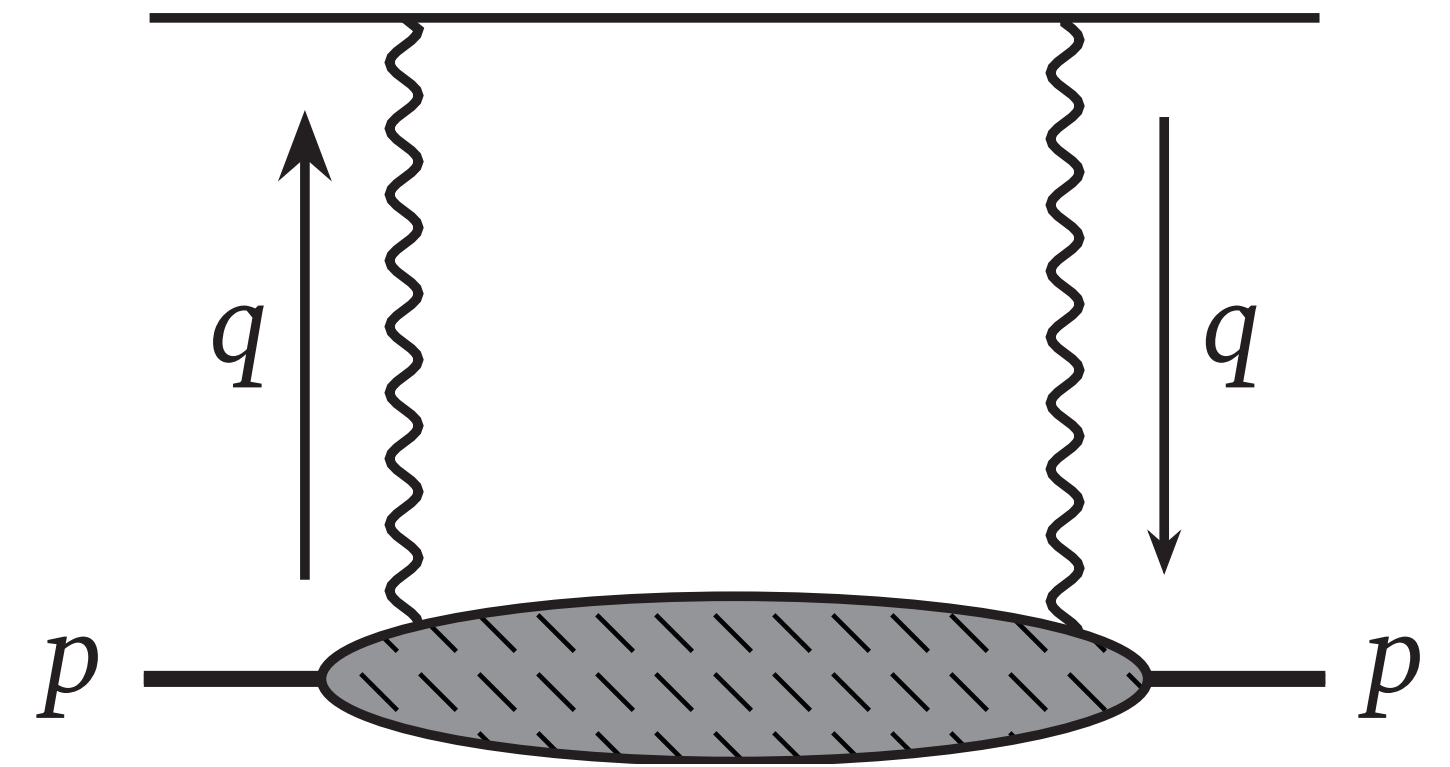


# Overview



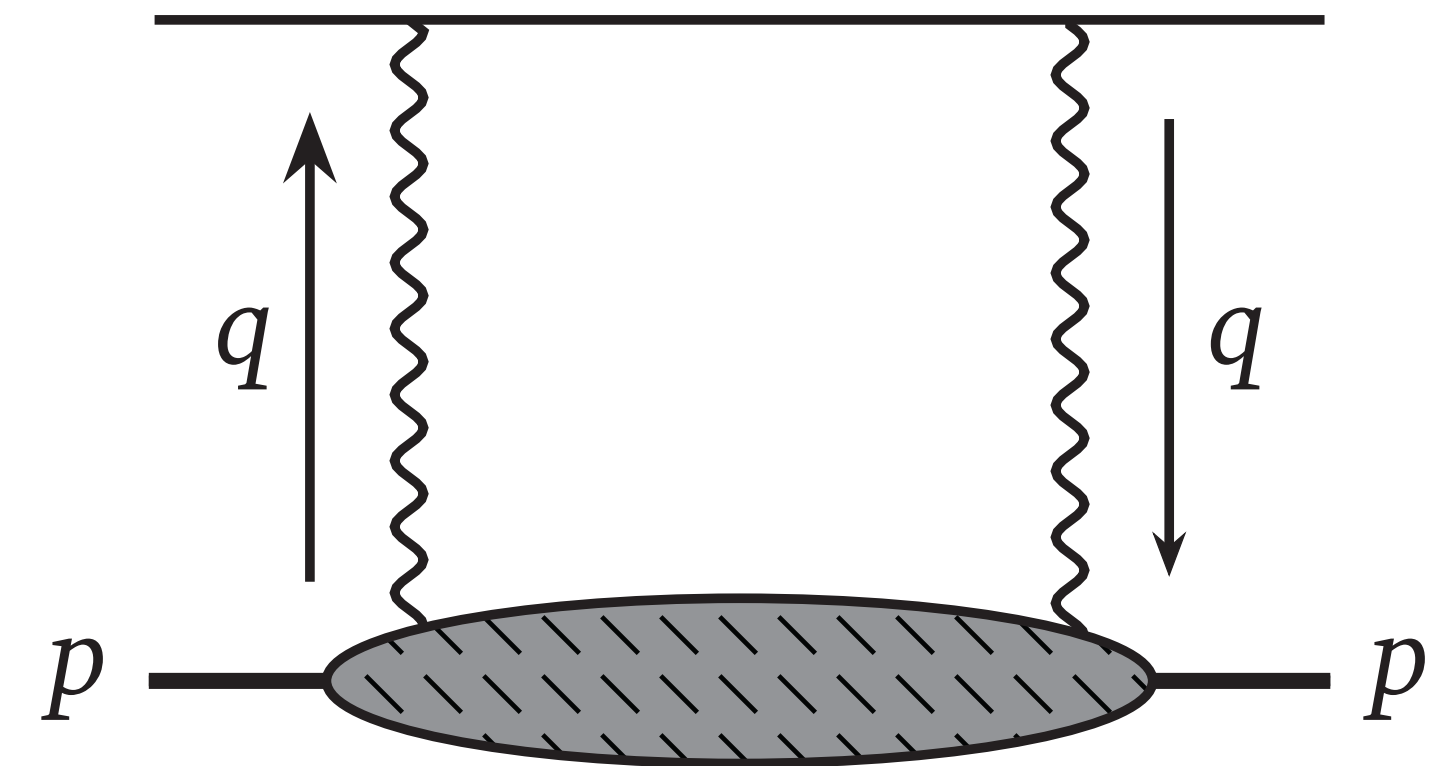
# Overview

- Improve hadronic corrections for muonic hydrogen spectroscopy



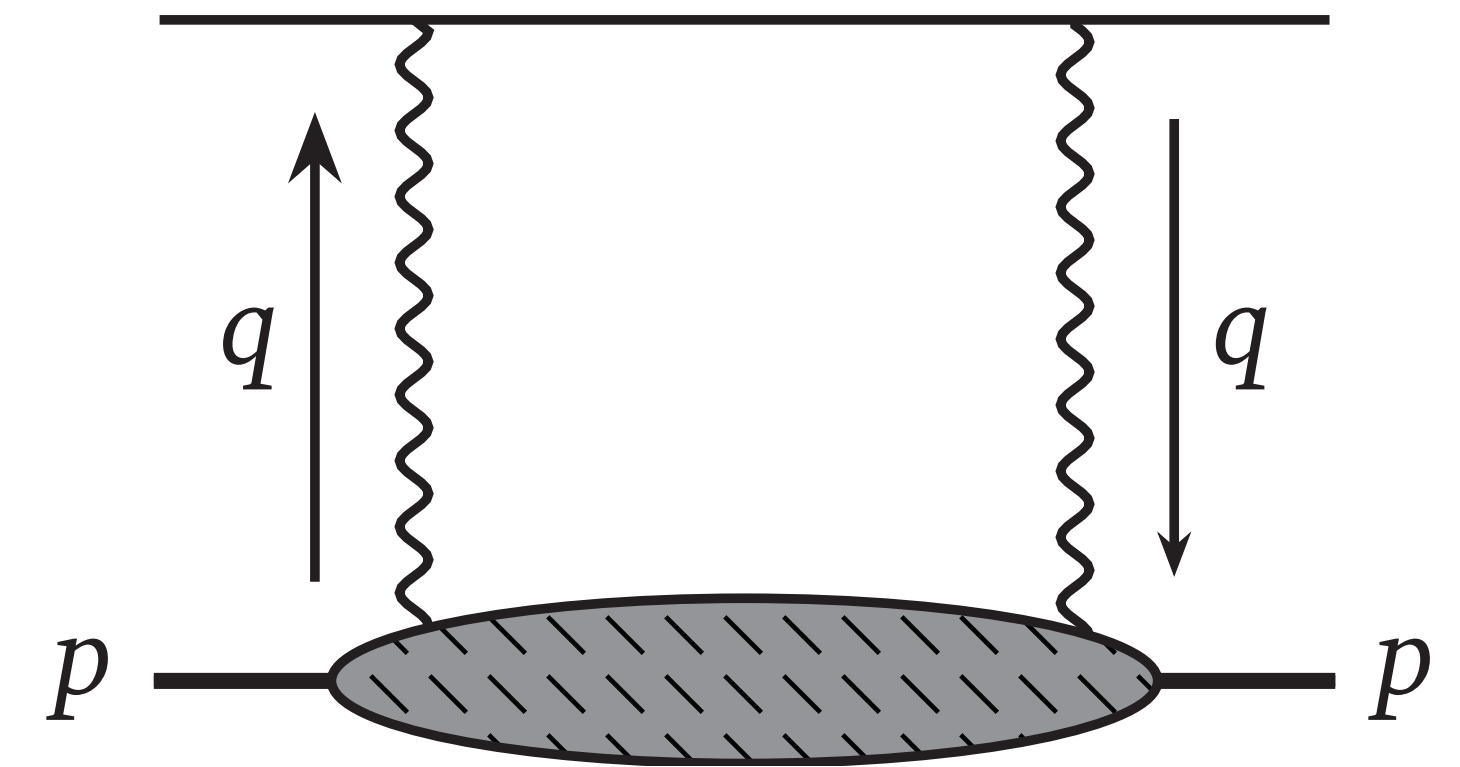
# Overview

- Improve hadronic corrections for muonic hydrogen spectroscopy
- 5-times improvement of theoretical prediction of Lamb Shift



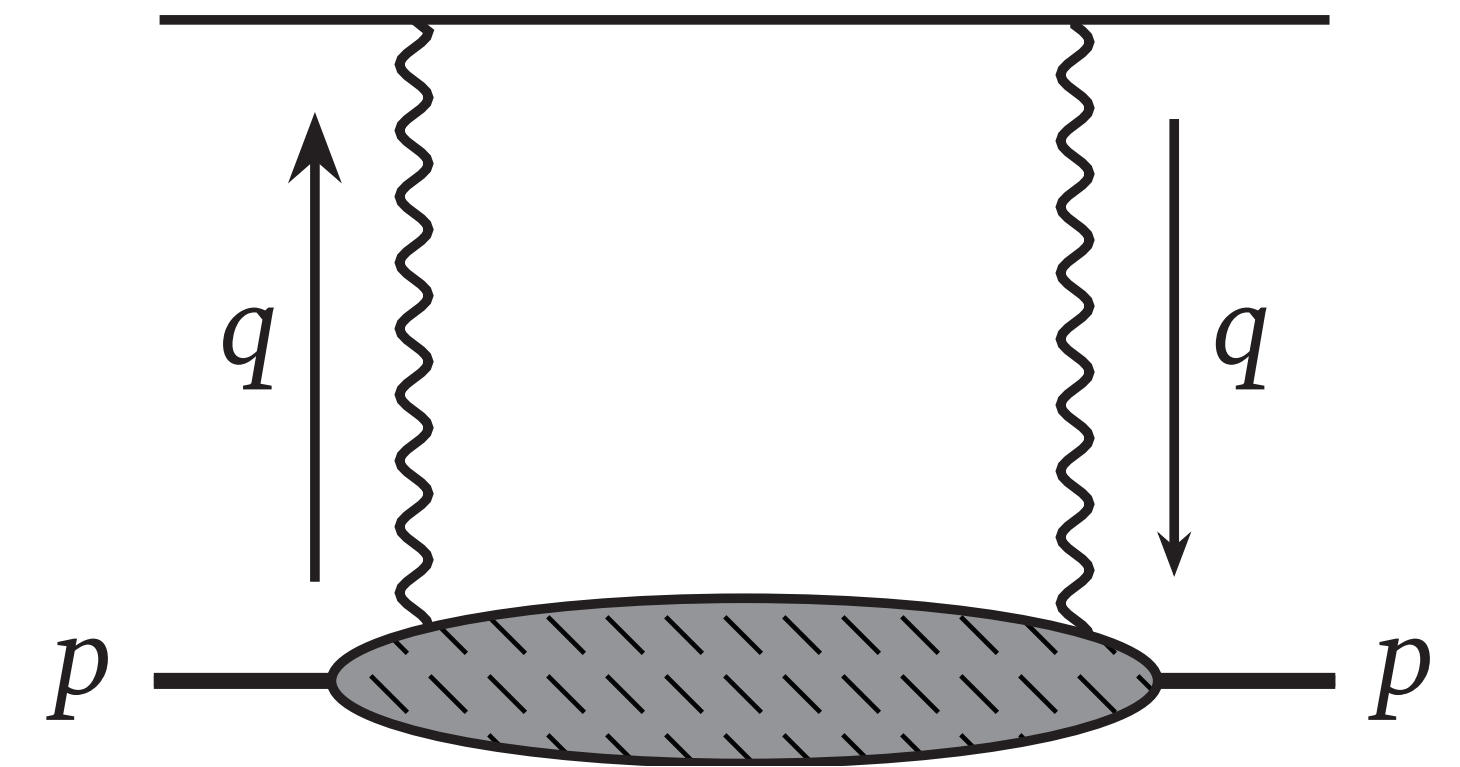
# Overview

- Improve hadronic corrections for muonic hydrogen spectroscopy
- 5-times improvement of theoretical prediction of Lamb Shift
- **2PE** effects studied using structure functions  $F_1(\nu, Q^2)$  and  $F_2(\nu, Q^2)$

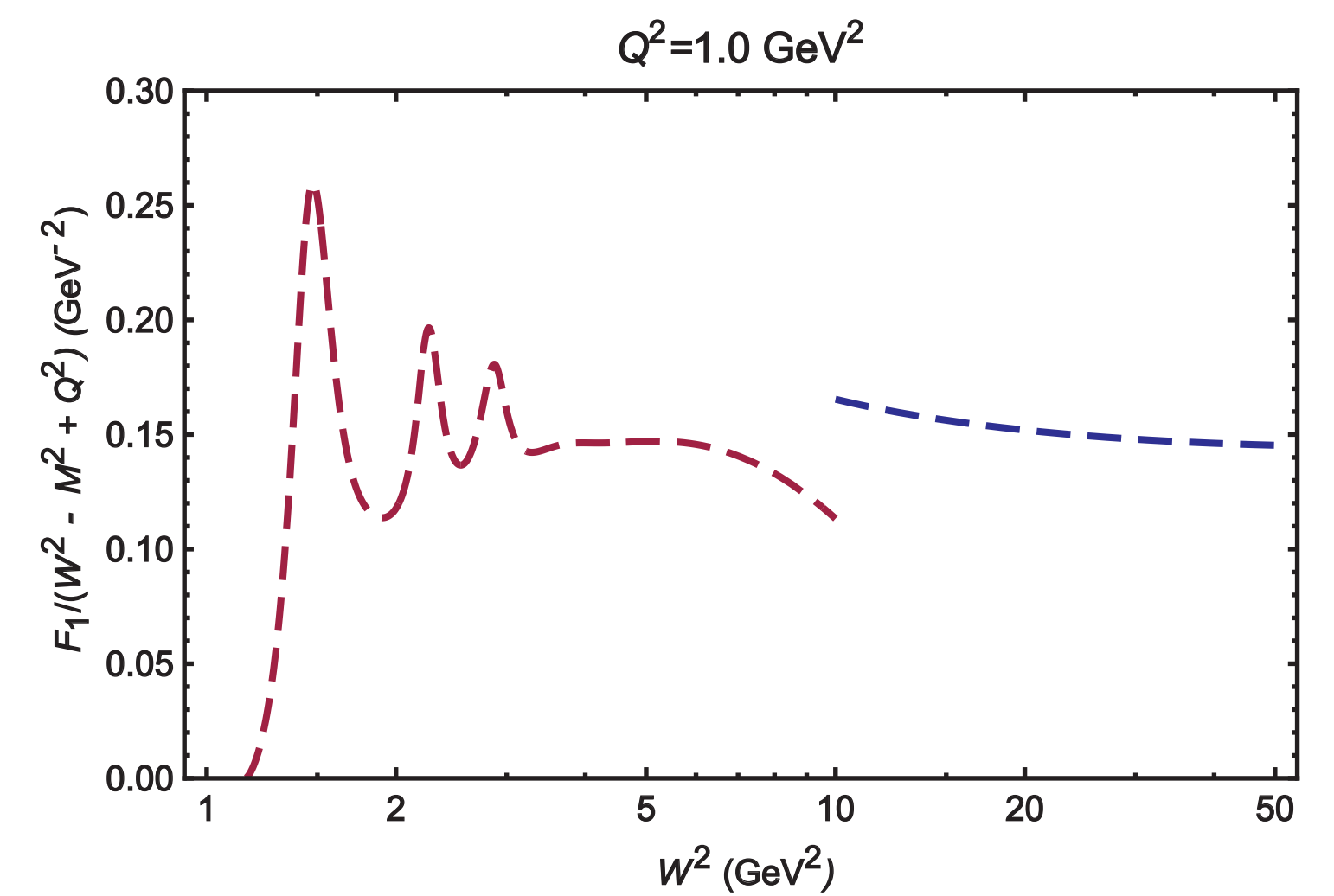
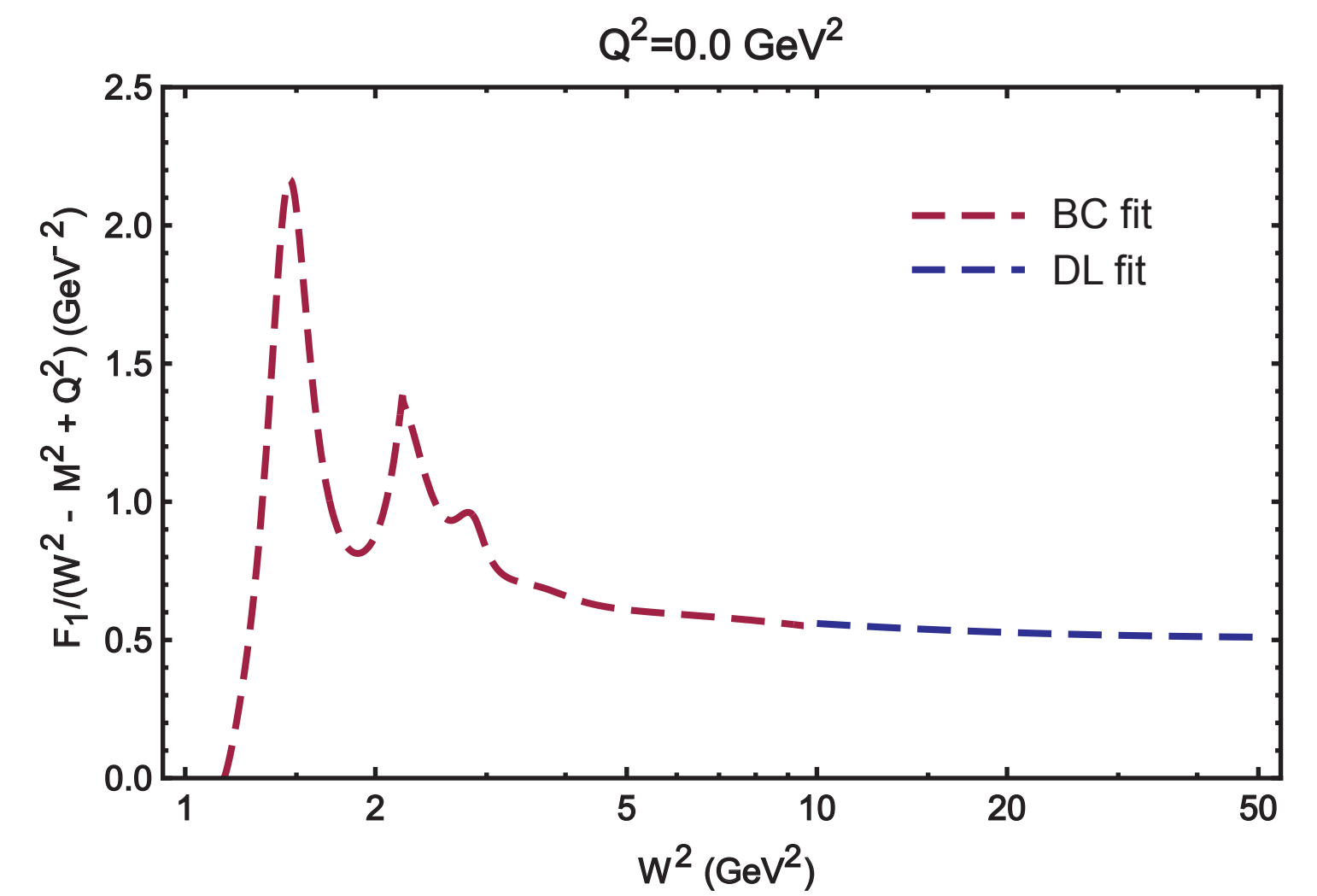


# Overview

- Improve hadronic corrections for muonic hydrogen spectroscopy
- 5-times improvement of theoretical prediction of Lamb Shift
- **2PE** effects studied using structure functions  $F_1(\nu, Q^2)$  and  $F_2(\nu, Q^2)$
- Data-driven dispersive analysis over the whole energy region



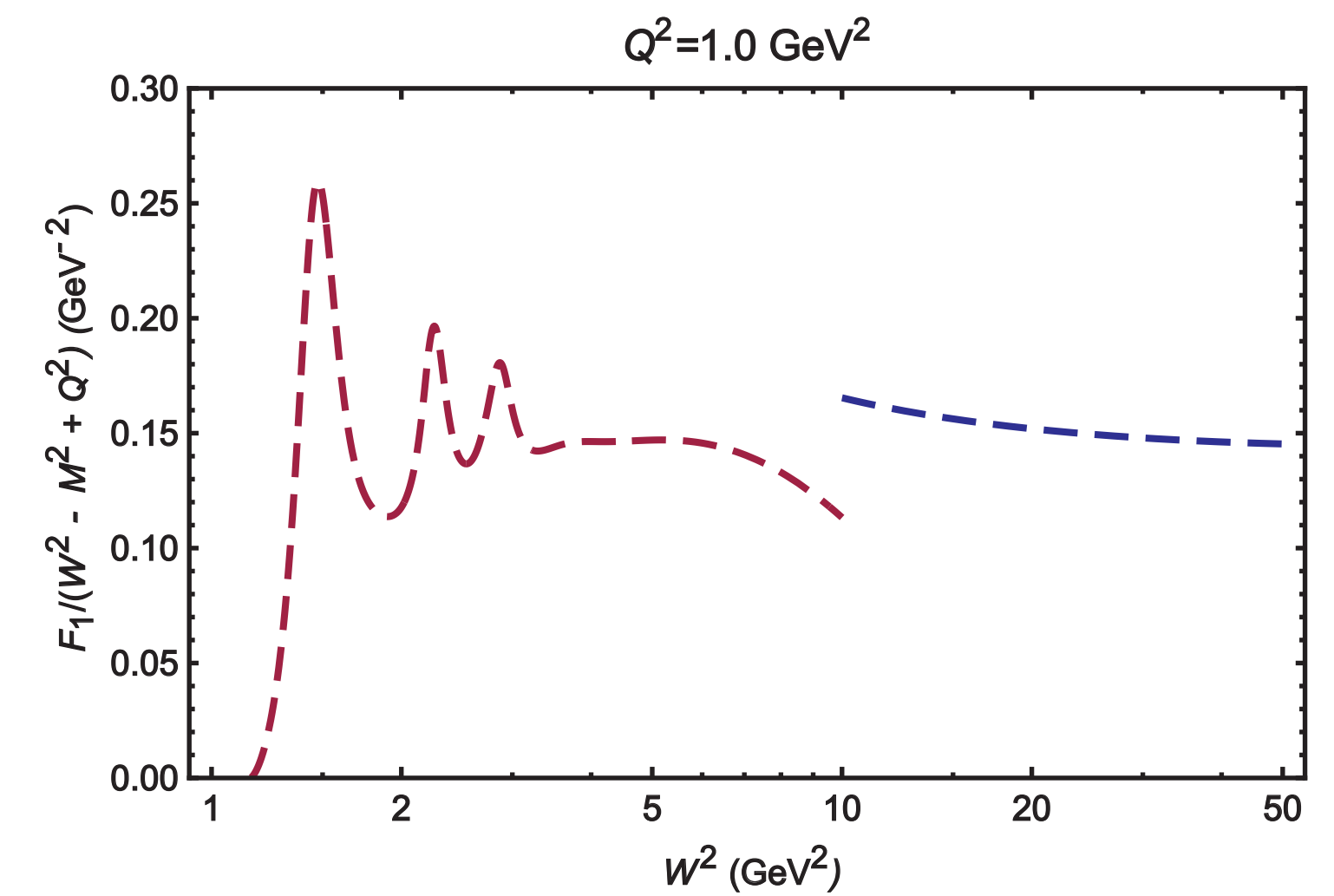
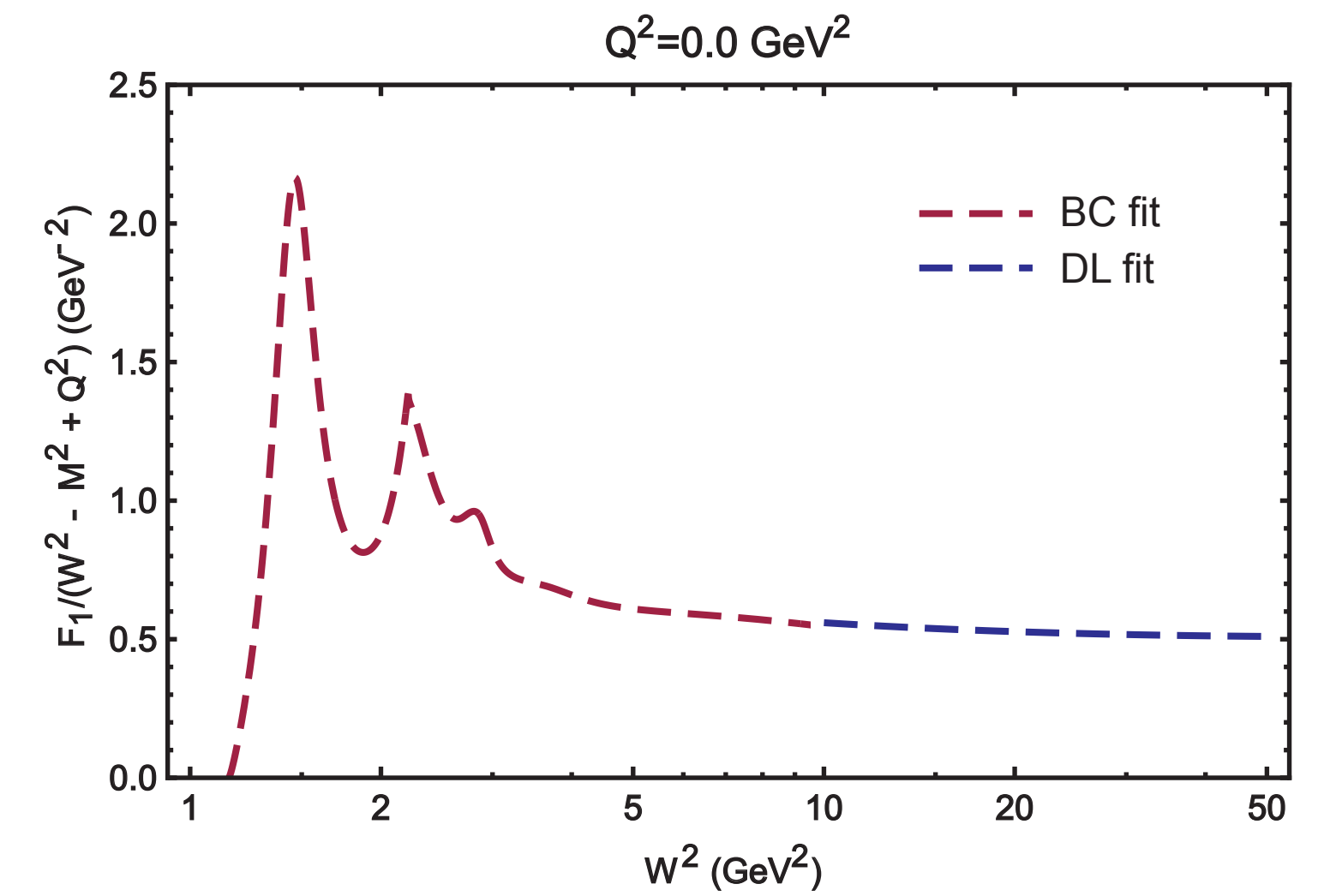
# Next steps



Fits from: Bosted and Christy, 2010  
Donnachie and Landshoff, 2004

# Next steps

- Improve parametrisation and fit in the resonance region

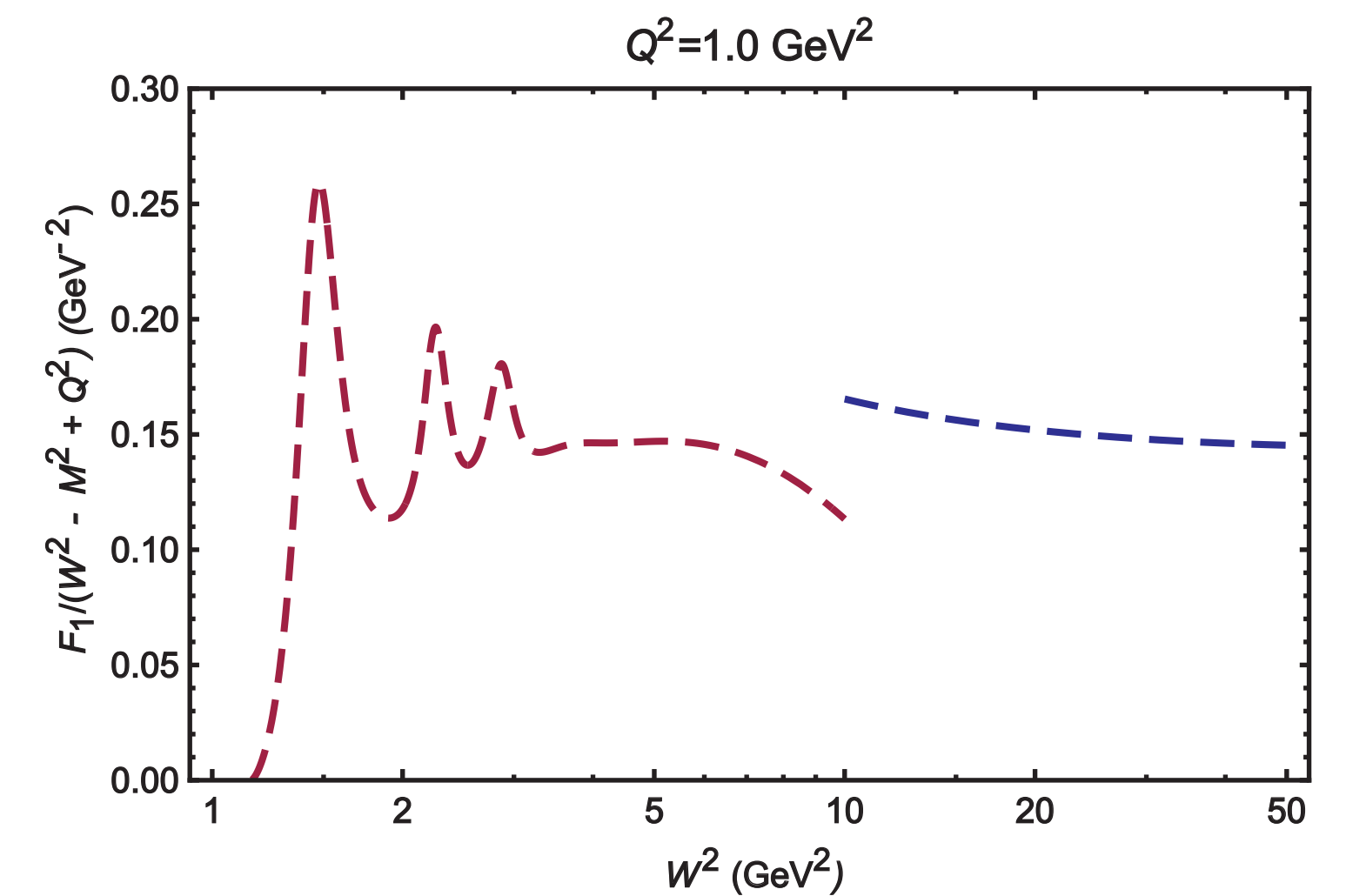
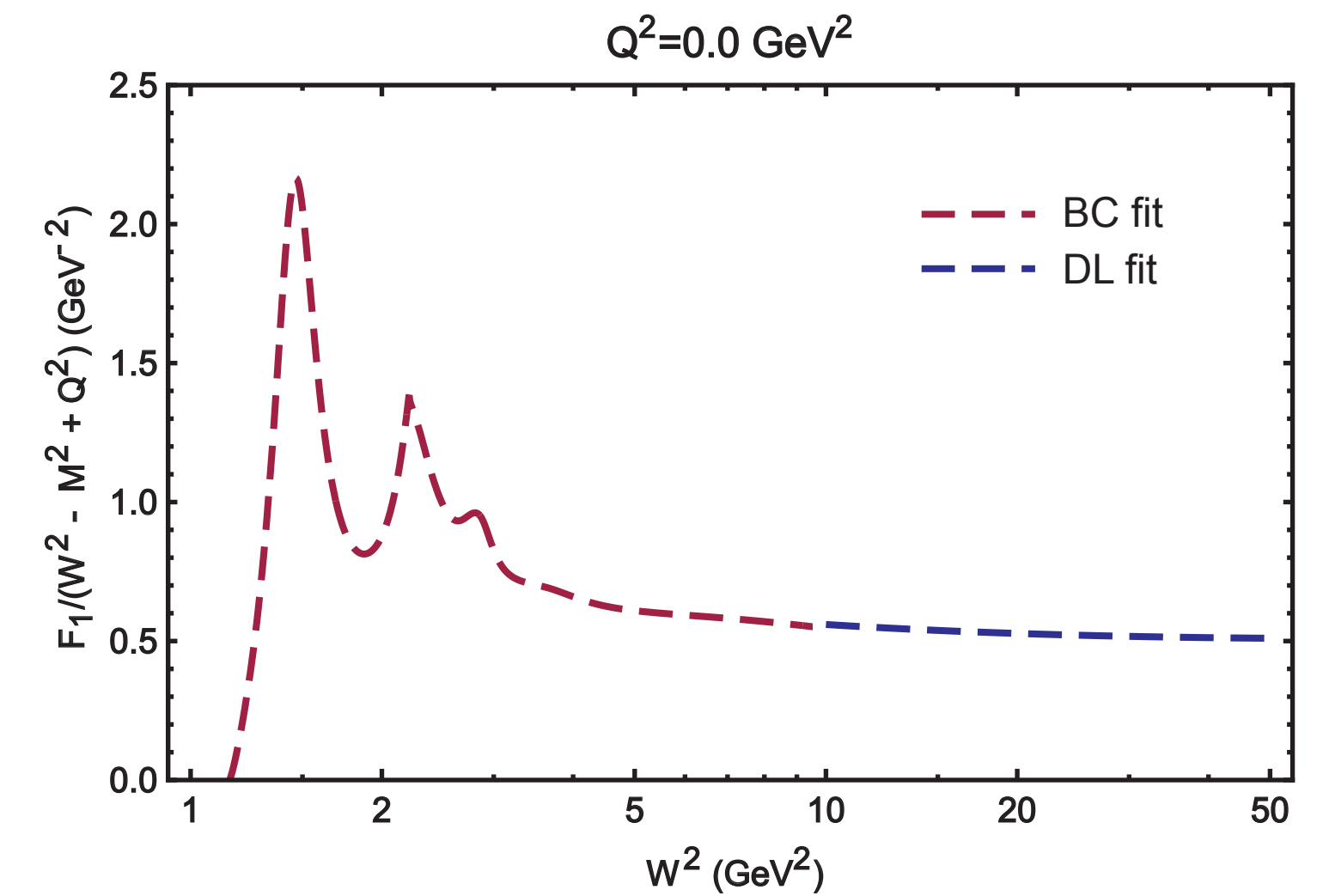


Fits from: Bosted and Christy, 2010  
Donnachie and Landshoff, 2004



# Next steps

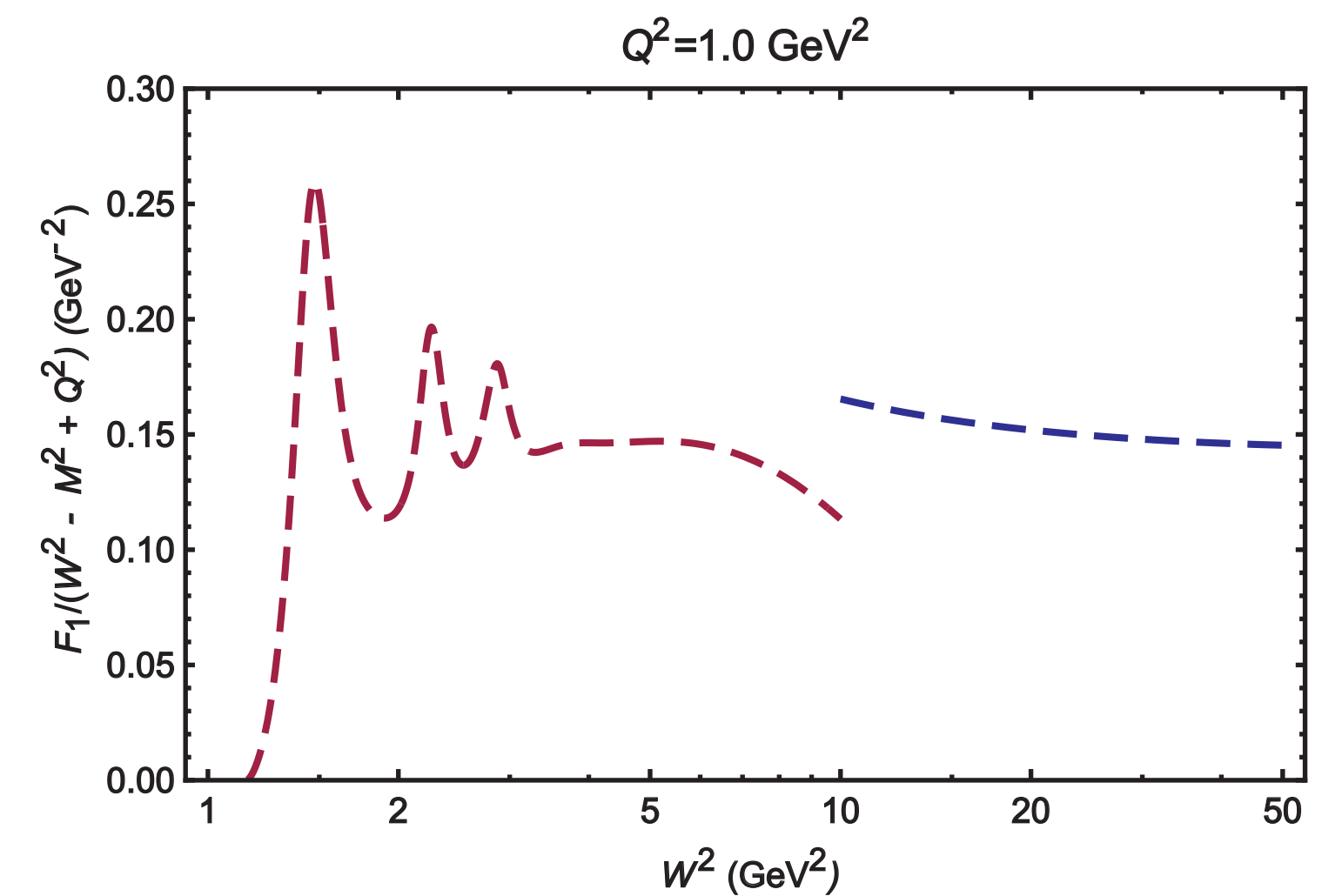
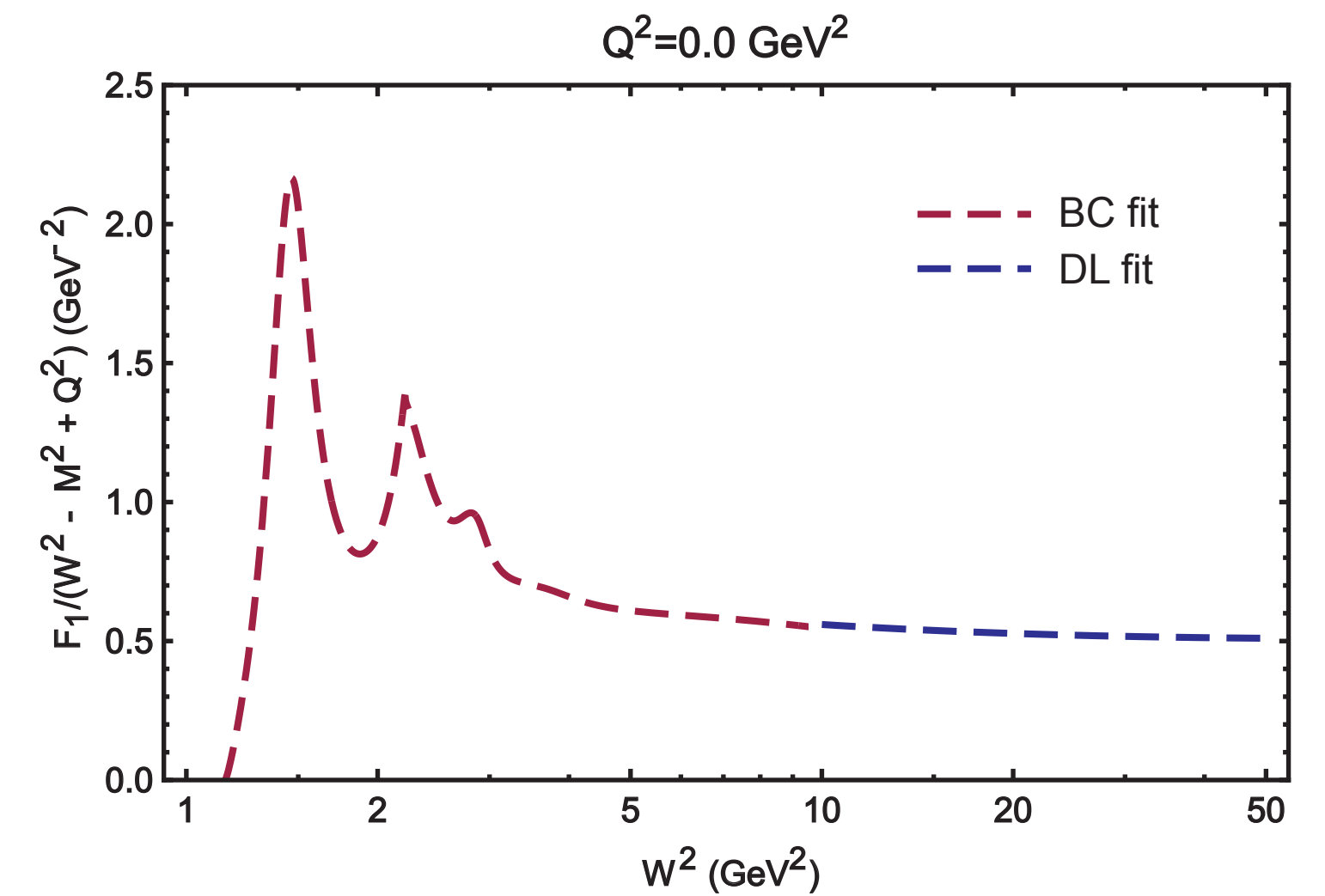
- Improve parametrisation and fit in the resonance region
- Include more recent data



Fits from: Bosted and Christy, 2010  
Donnachie and Landshoff, 2004

# Next steps

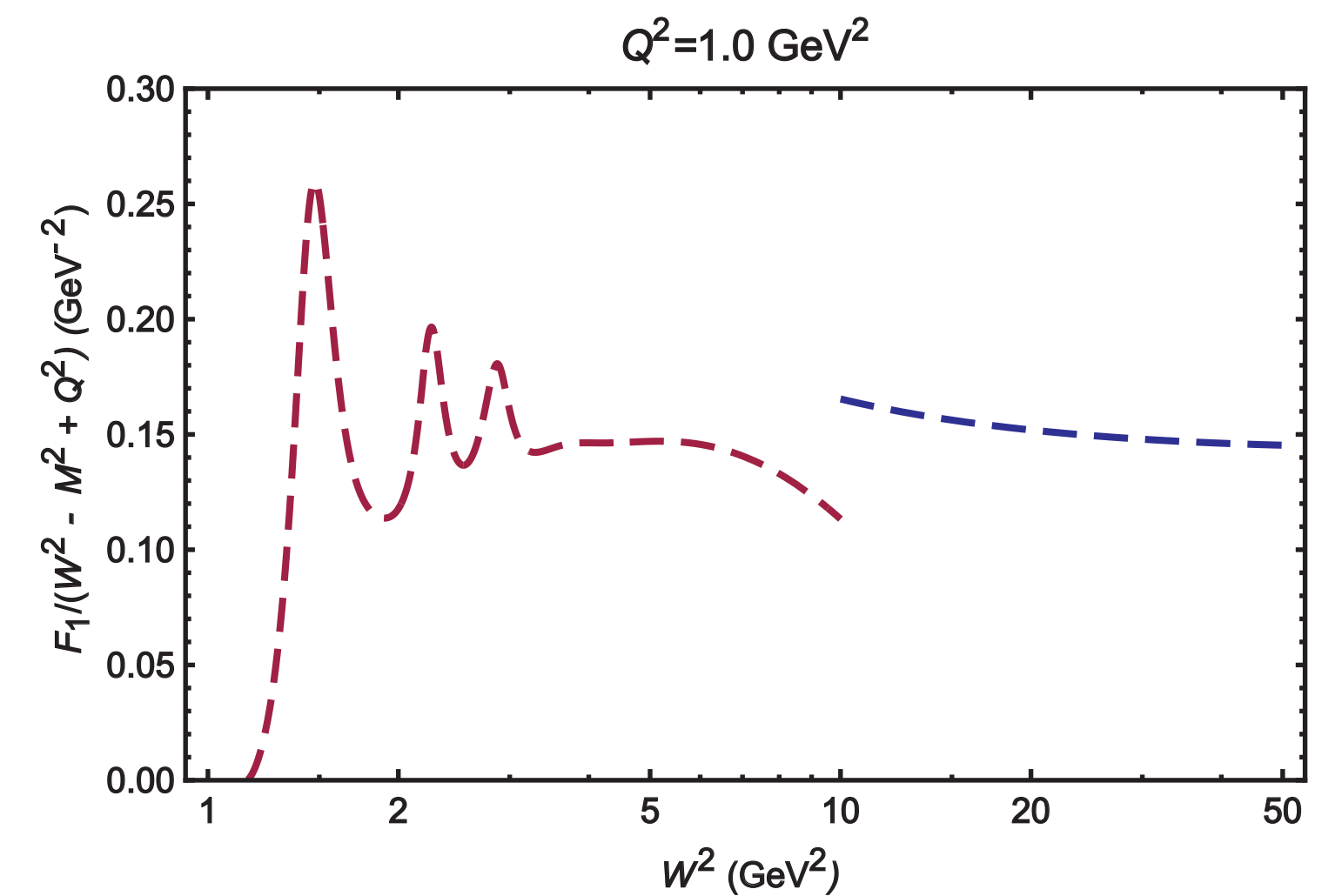
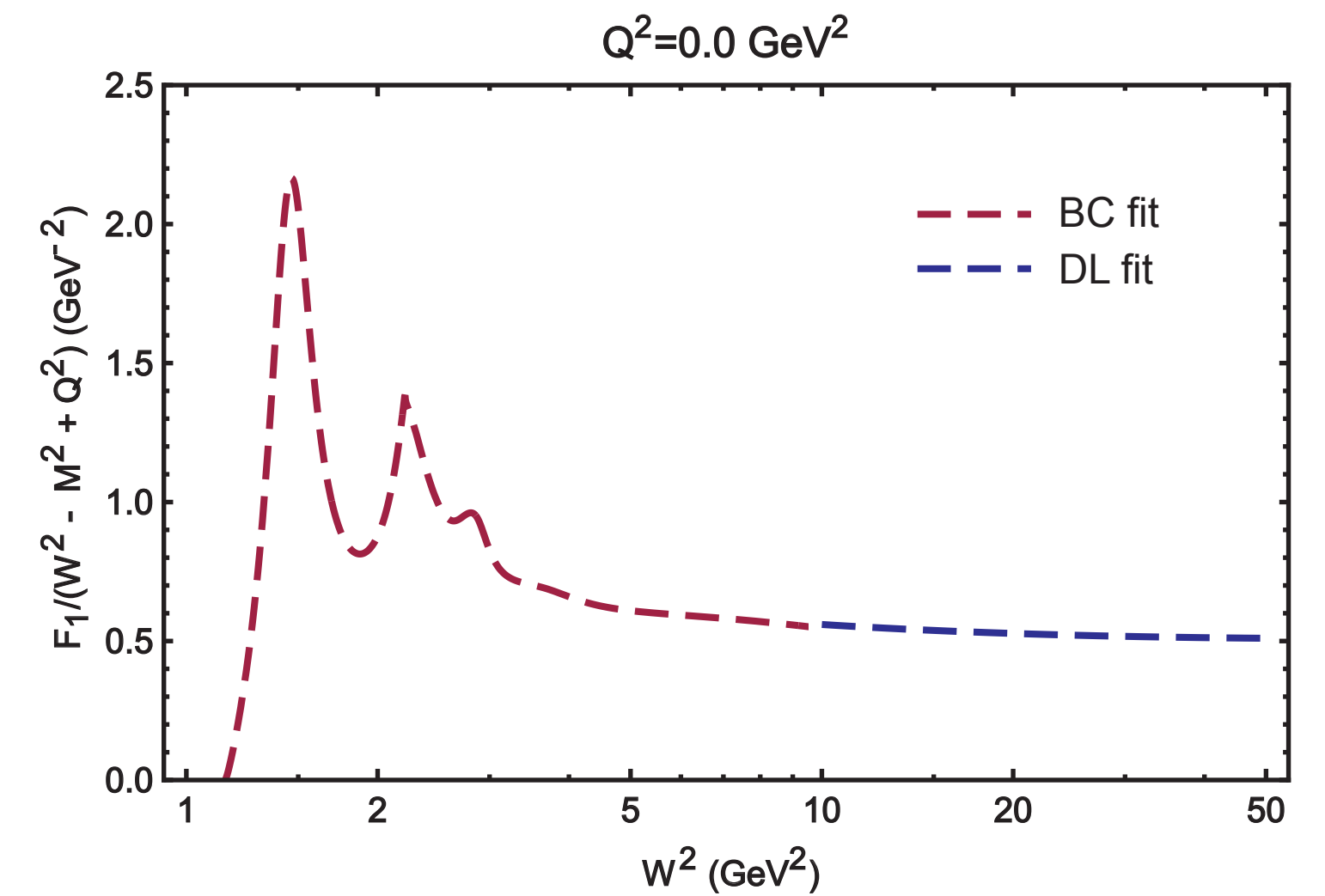
- Improve parametrisation and fit in the resonance region
- Include more recent data
- Compare Regge fits to unitarity consistent ones



Fits from: Bosted and Christy, 2010  
Donnachie and Landshoff, 2004

# Next steps

- Improve parametrisation and fit in the resonance region
- Include more recent data
- Compare Regge fits to unitarity consistent ones
- Connect different regions with **analytic paramertization**

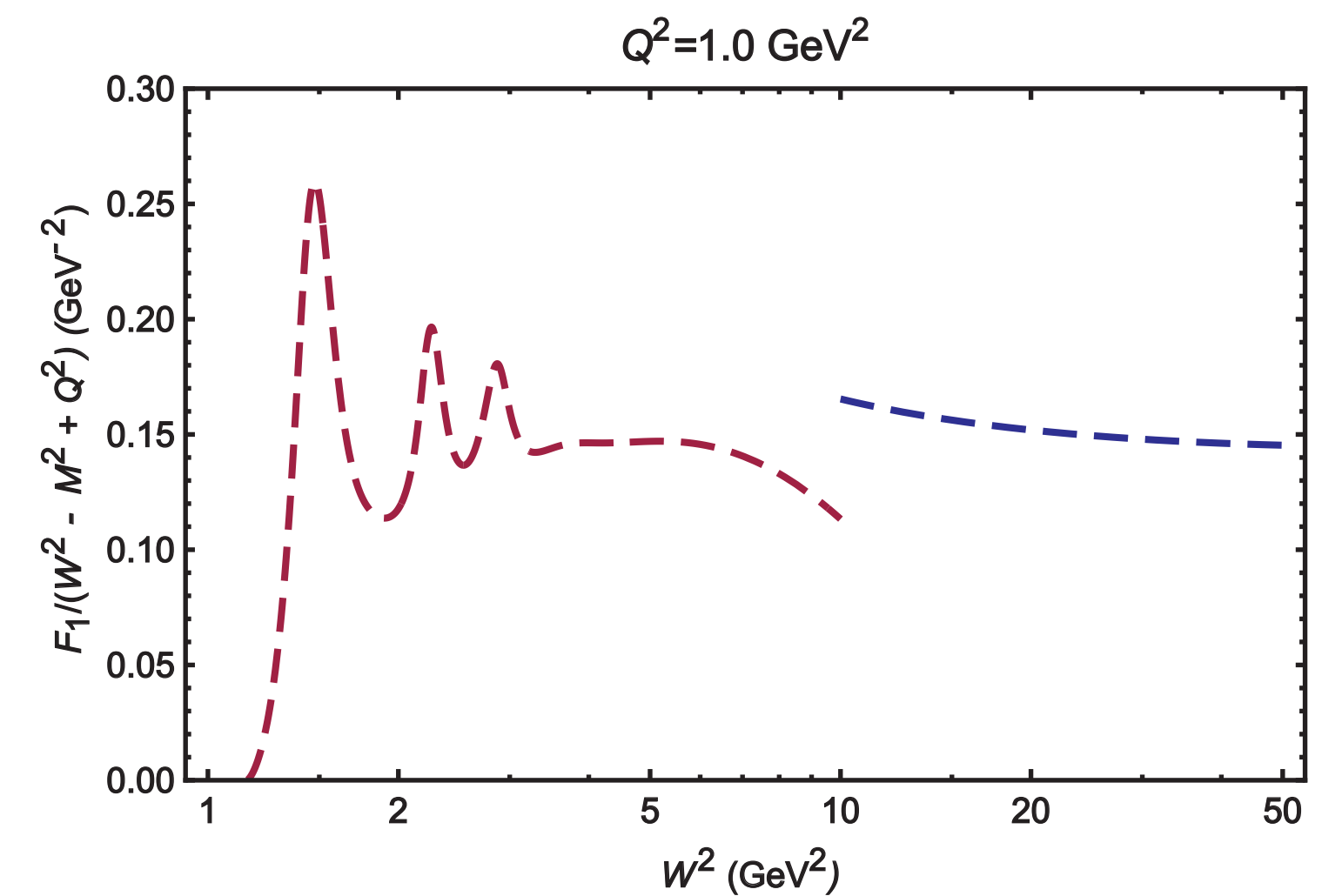
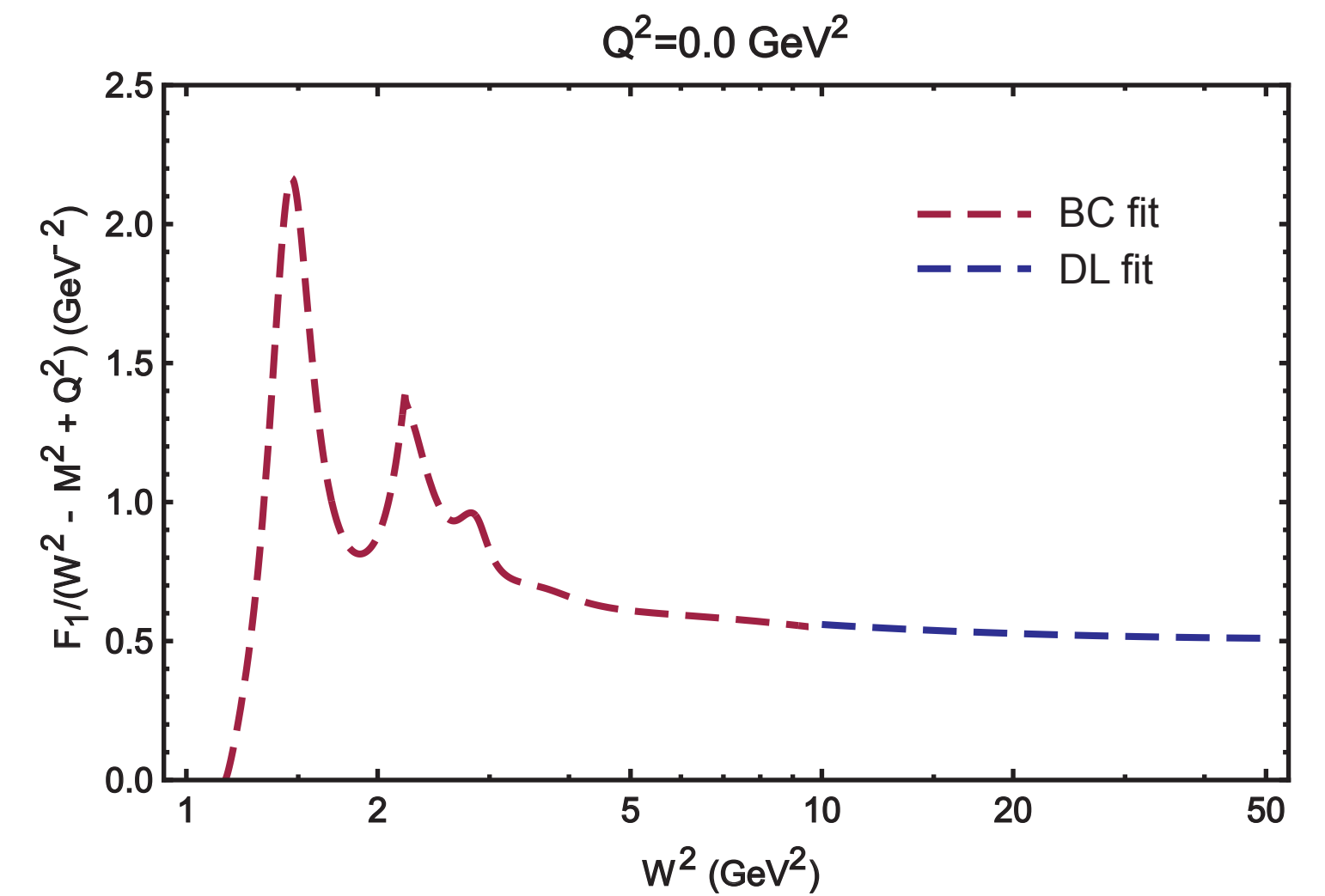


Fits from: Bosted and Christy, 2010  
Donnachie and Landshoff, 2004

# Next steps

- Improve parametrisation and fit in the resonance region
- Include more recent data
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- Connect different regions with **analytic paramertization**

# Thank you



Fits from: Bosted and Christy, 2010  
Donnachie and Landshoff, 2004