

Report of the committee to review the ODU Analysis of Meson-baryon Interference

Summary points for Hall B CCC Meeting, Friday March 19, 2010

1 Conclusions from Report (Sep 29, 2009) [1]

The committee does not believe the excess of events in the MM_{K_S} missing mass represents a robust signal that can be used to claim a discovery. Neither the modeling of the interference process (Section 7), nor the modeling of significance through variation in cuts (Section 5.3) have shown evidence to support the ODU claims. We conclude by specifically addressing each of the main questions in the charge:

1. Are all the analysis cuts applied justified? No. There is no convincing evidence that the use of the t_K analysis cut should enhance an interference signal.
2. Could the claimed signal be an artifact of the analysis procedure used? Yes. The excess of events above background in the MM_{K_S} spectra depend on strong analysis cuts which enhance the peaking structure in a manner that is not expected from an interference signal.
3. What is a significance of the signal, if any. The excess of events in the MM_{K_S} missing mass spectra corresponds to a maximum significance of 4σ if interpreted as an interference signal.

2 Conclusion from Report Addendum (December 22, 2009) [2]

The committee feels that the new interpretation for the validity of the t-cut presents a completely new context for claiming a pentaquark signal from this data set. Instead of answering all concerns related to this selection in the analysis, it opens up major new questions:

1. If direct Θ production is comparable to the interference signal, why should one select the narrow region around the ϕ for the analysis? Why would this particular analysis be competitive with existing CLAS limits that data over a much larger kinematic range?

2. The claim that we can be sensitive to interference effects that vary though the M_{KK} mass range needs to carefully studied and justified, as our experimental resolution is likely to wash out any signal.

References

- [1] Working Group Report of the ODU Analysis of Meson-baryon Interference. Report of the committee to review the ODU Analysis of Meson-baryon Interference. DRAFT v3, September 29, 2009.
- [2] Working Group Report of the ODU Analysis of Meson-baryon Interference. Addendum to the Report of the committee to review the ODU Analysis of Meson-baryon Interference. December 22, 2009, 2009.

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Note: "Comments" come from reviewers, and "Responses" come from the authors.

- [Cover letter from Spectroscopy Working Group Chair](#)  E. Pasyuk, January 19, 2010.
- [Cover letter to Addendum to Committee 2009 Report](#)  Committee, December 28, 2009.
- [Addendum to Committee 2009 Report](#)  Committee, December 22, 2009.
- [Response to the Draft of the Final Report](#)  M.Amaryan, November 29, 2009.
- [Draft presentation by the review committee](#)  Committee, October 3, 2009.
- [ODU response to the draft report by the review committee](#)  M.Amaryan, October 2, 2009.
- [Draft report by the review committee](#)  Committee, September 29, 2009. [Confirmed unchanged report as final on December 28, 2009].
- [\[1\]](#) , [\[2\]](#) , [Sensitivity of peaks to cuts](#)  F. Klein, September 28, 2009
- [Once more about the tcut](#)  M. Amaryan, September 19, 2009
- [Study of signal-to-background ratios for various t_K selection cuts](#)  E. Smith, September 18, 2009
- [Fitting Quality](#)  G. Gavalian, September 15, 2009
- [Significance estimation for observed signal from g11 data](#)  G. Gavalian, September 13, 2009
- [Response to significance note](#)  M. Amaryan, September 8, 2009
- [Pentaquark-phi\(1020\) Interference Simulation](#)  D. Weygand, August 28, 2009
- [Study of the dependence of the estimated signal significance on signal-to-background](#)  E. Smith, August 28, 2009
- [Empirical backgrounds and estimated signal significance](#)  E. Smith, August 21, 2009
- [Response Aug 12](#)  [kin_fit](#)  [no_kin_fit](#)  August 12, 2009
- [Comments Aug 6](#)  [plot_Pad_2_aug5](#)  [penta_moskov_11_p6_aug6](#)  August 6, 2009
- [Response Aug 5](#)  [plot_Pad_2_aug5](#)  [plot_Pad_ODU_2_aug5](#)  August 5, 2009
- [Comments Aug 4](#)  [statcomparison.png](#)  August 4, 2009
- [Response Aug 4](#)  [SigStudy](#)  [SigStudy_sidesub](#)  August 4, 2009
- [Valery data set](#)  [Link](#)  July 24, 2009
- [Response Jul 23](#) , [PentaFits.pdf](#) , [tar file](#)  July 23, 2009
- [Response Jul 21](#)  July 21, 2009
- [Comments May 29](#)  May 29, 2009
- [Comments on Statistical Tests](#)  D. Ireland, May 29, 2009
- [Answer to Comments 1](#)  May 14, 2009
- [tphi vs tks](#)  M. Amaryan, April 23, 2009
- [Comments 1](#)  April 9, 2009