Discussion of data taking plan for charmonium(-like) studies

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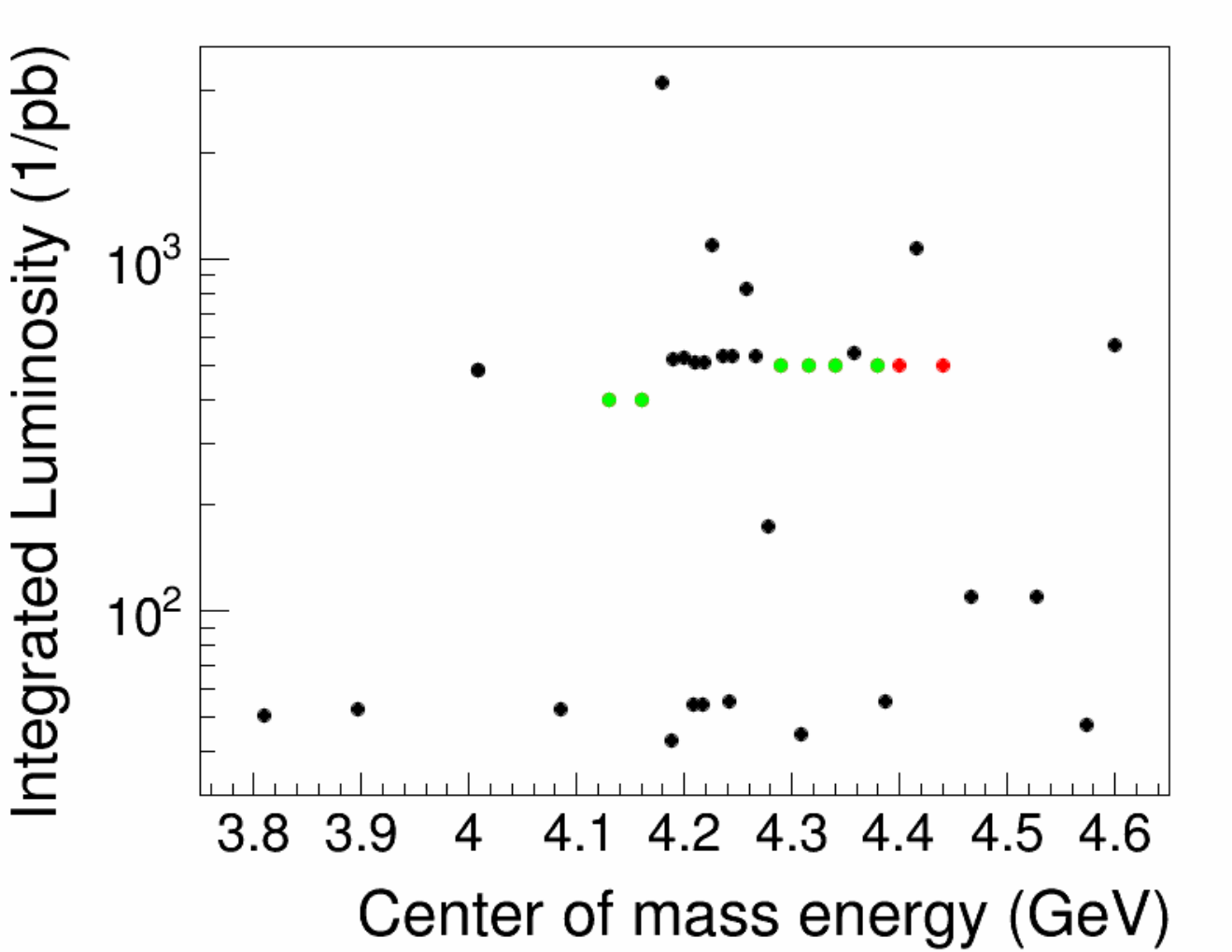
Outline

- What data we already have
- Previous proposal
- Review of the line shapes of some channels
- Options for next round data taking proposal

About 13 + 3.8 fb^{-1} XYZ data samples



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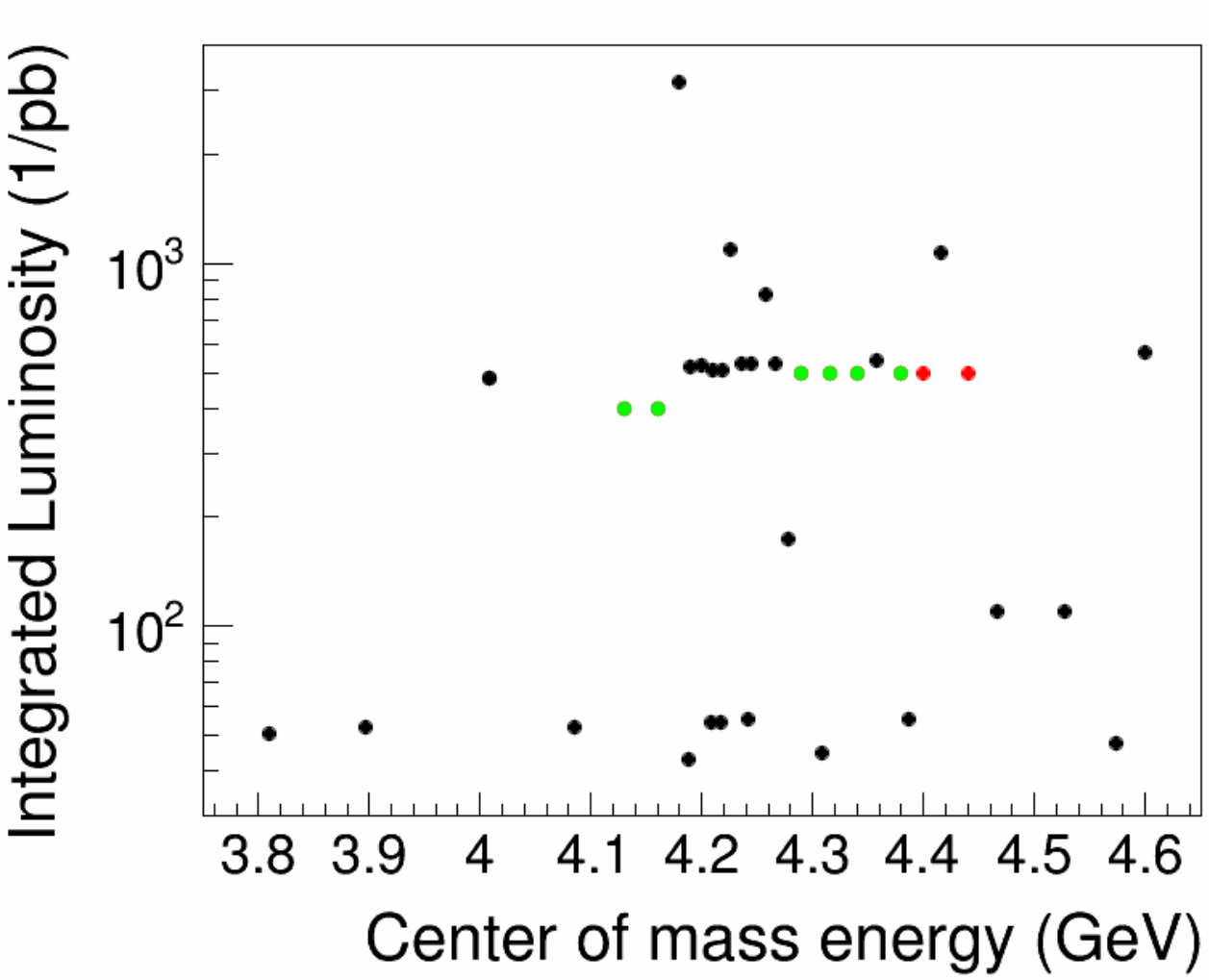

With these samples we have observed

- Line shapes of cross sections => Y(4220) will have better understanding of Y(4360) $\psi(4160)$ and $\psi(4415)$

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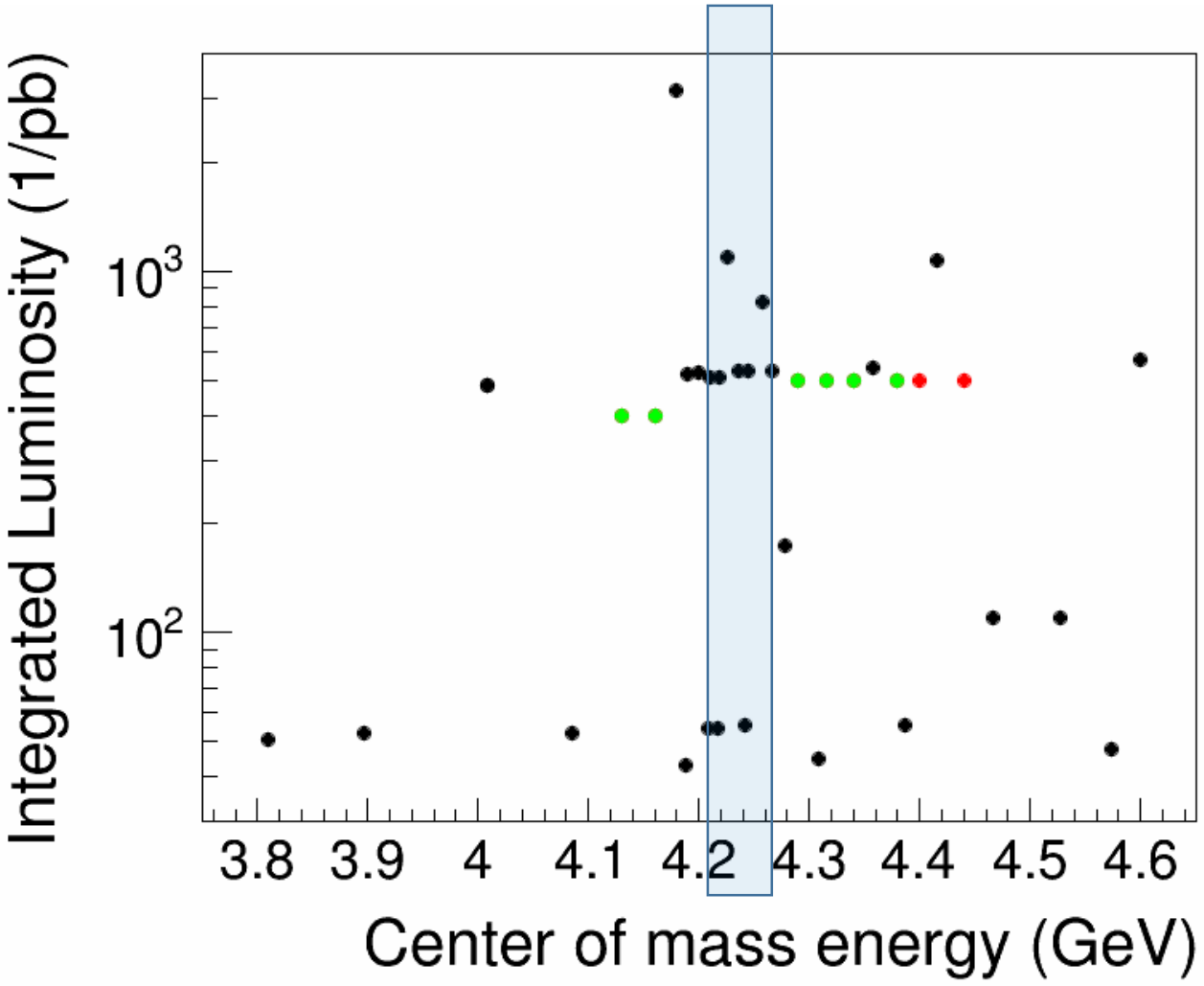

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- $Z_c(3900)$ and $Z_c(4020)$
- $X(3872)$ and $X(3940)$, etc.

Previous proposal

- ***Is time to stay at one point to collect large statistics?***
- ***Move on to > 4.6 GeV?***

The Big Plan @2014

- Start from 4.0 GeV up to the maximum energy BEPCII can reach (≥ 4.6 GeV)
- 10 MeV step (slight adjust ~ thresholds, skip those 6 points we have already collected large samples)
- 500 pb^{-1}/point (from the size of the existing samples!)

- Year 1: 4.0-4.1 GeV
- Year 2: 4.1-4.2 GeV
- Year 3: 4.2-4.3 GeV
- Year 4: 4.3-4.4 GeV
- Year 5: 4.4-4.5 GeV
- Year 6: 4.5-4.6 GeV
- Years 7, 8, ...: >4.6 GeV

- ~ 4.5/fb per year!
- A bit conservative than BEPCII design luminosity (5/fb/yr)!
- Top-up injection allows more integrated luminosity!
- If "Year 1" = 2015, we finish 4.6 GeV data taking in 2021!

Cross section line shapes

From Yuping Guo

Some features of the line shapes

- No obvious structure is found between 4.5 and 4.6 GeV except K^+K^-J/ψ
- Many channels shows structure around Y(4360)
  - Should Y(4360) be the next Y(4220), the source of productions of the excited Z an X states?

Options of data taking strategy

- Continue to do the fine scan from 4.45 to 4.59 GeV
  - 15 points x 400 pb^{-1} = 6 fb^{-1}
  - For Z_{cs} and higher excited D_s^*
- Stay at 4.36 GeV
  - 6 fb^{-1}, ten times to present statistics
  - New Z_c and X states
- Move on beyond 4.6, from 4.6 to 4.92 GeV
  - 9 points x 500 pb^{-1} = 4.5 fb^{-1} (4.62, 4.64, 4.66, 4.68, 4.70, 4.75, 4.80, 4.85, 4.92)
  - Y(4660) and charmed baryons
- …