



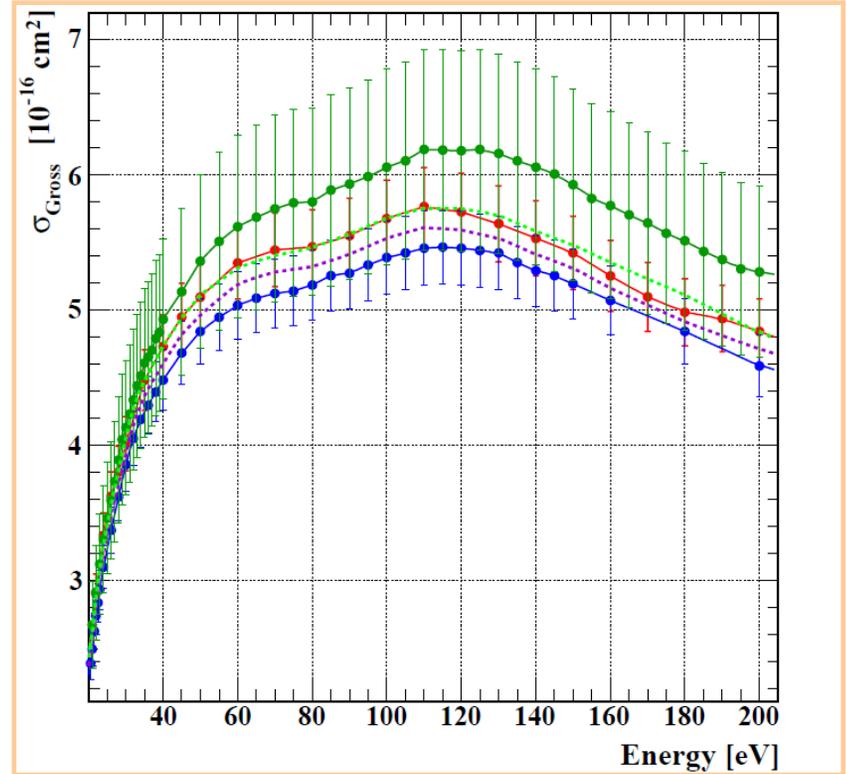
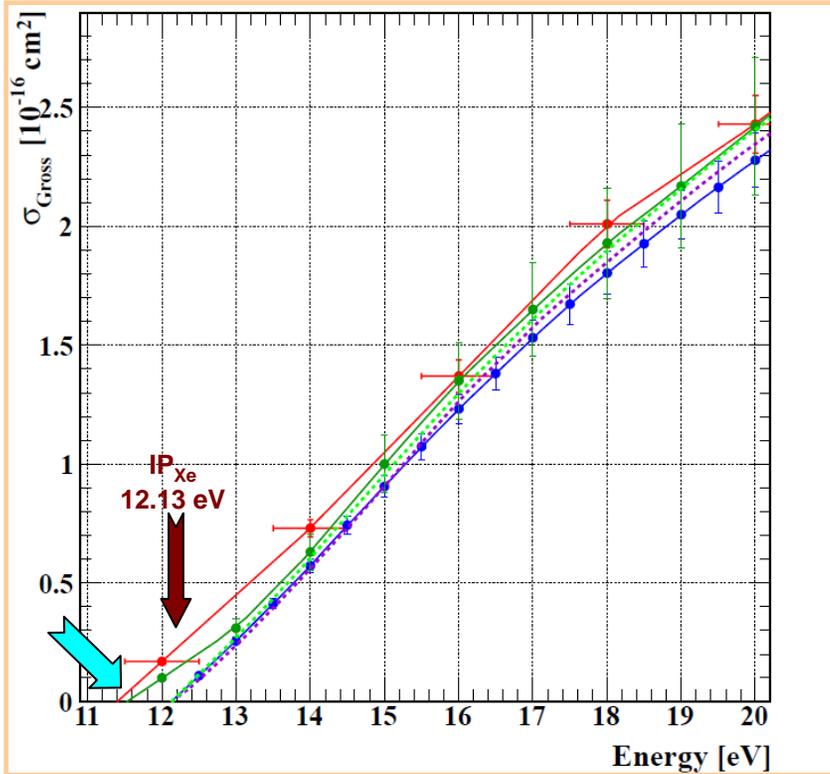
Xenon cross section update

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Available data

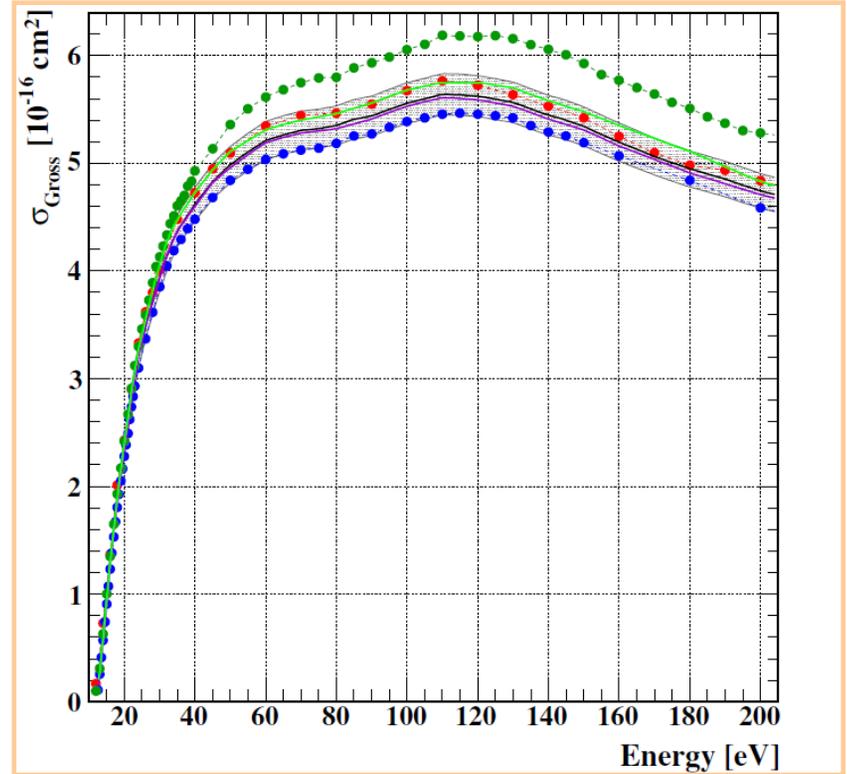
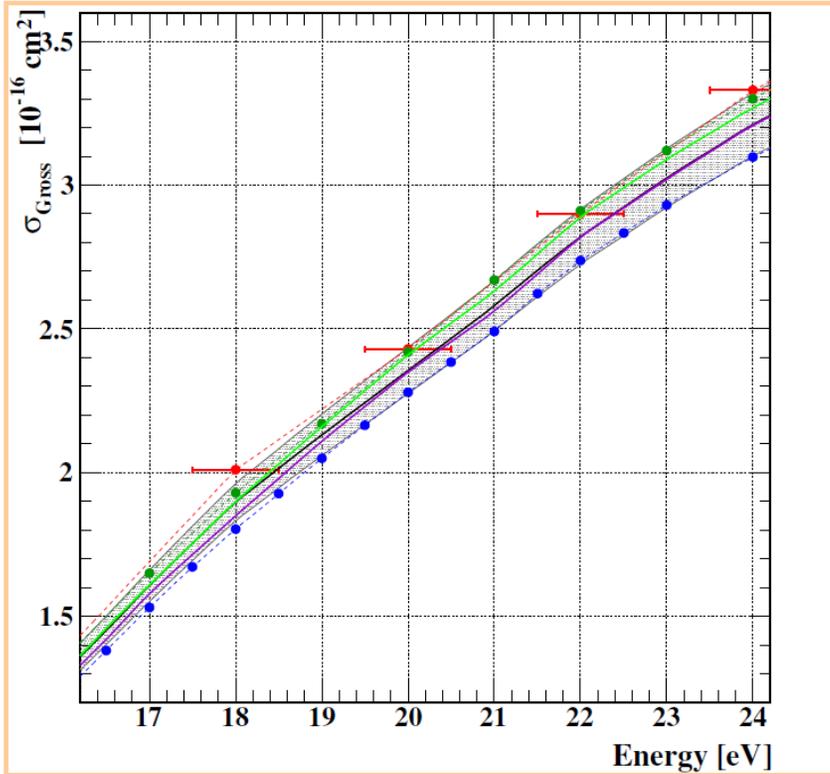
- ❖ More than 20 published data for Xe cross sections!
 - ❖ Mostly relative cross sections are measured,
 - ❖ or calculations
- ❖ Only 3 independent measurements:
 - ❖ D. Rapp and P. Englander-Golden, *J. Chem. Phys.* **43** (1965) 1464–3775.
 - ❖ R.C. Wetzel et al., *Phys. Rev. A* **35** (1987) 559–577.
 - ❖ R. Rejoub et al., *Phys. Rev. A* **65** (2002).

Available data



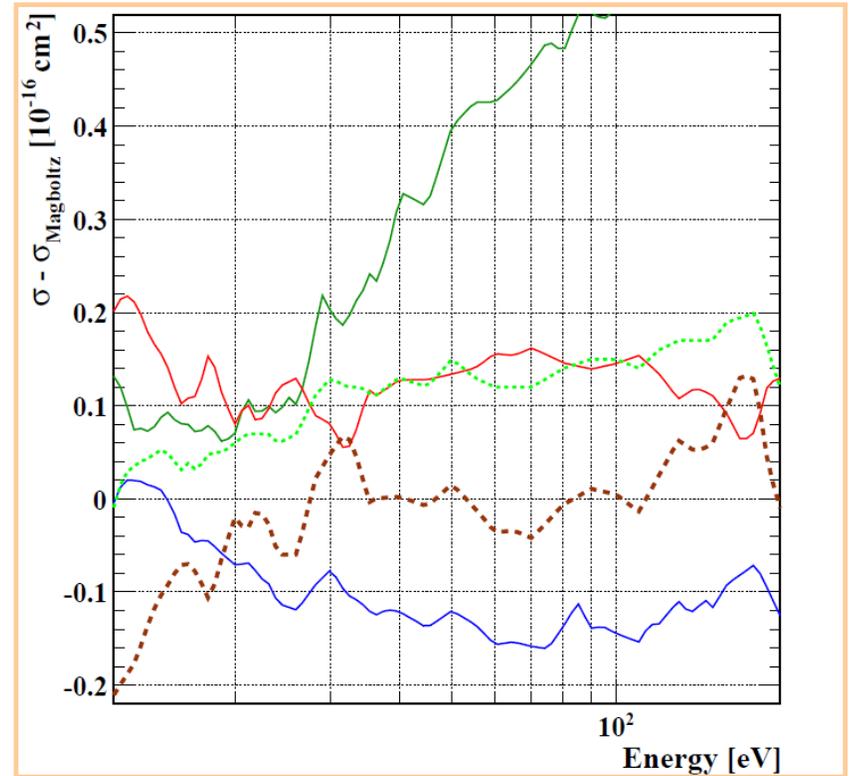
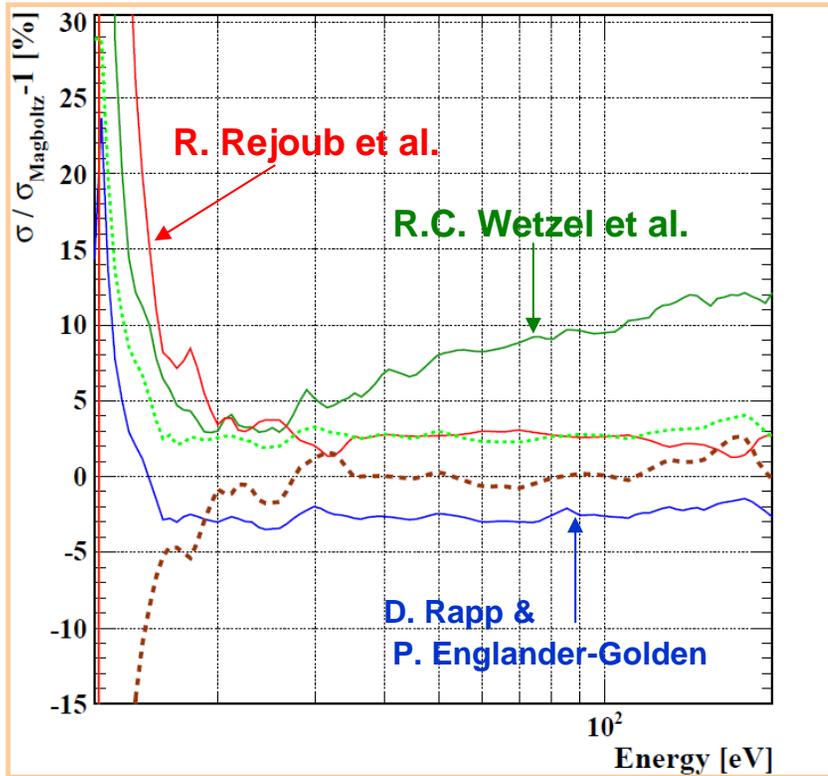
- ❖ D. Rapp and P. Englander-Golden, blue lines, 5 % errors;
- ❖ R.C. Wetzel et al., straight dark-green lines, up to 12 % errors;
- ❖ R. Rejoub et al., red lines, 5 % errors on x-section, 0.5 eV uncertainty on energy;
- ❖ Magboltz 8.9.1, dashed purple lines;
- ❖ Magboltz 8.9.3, dashed green lines.

Weighted cross sections



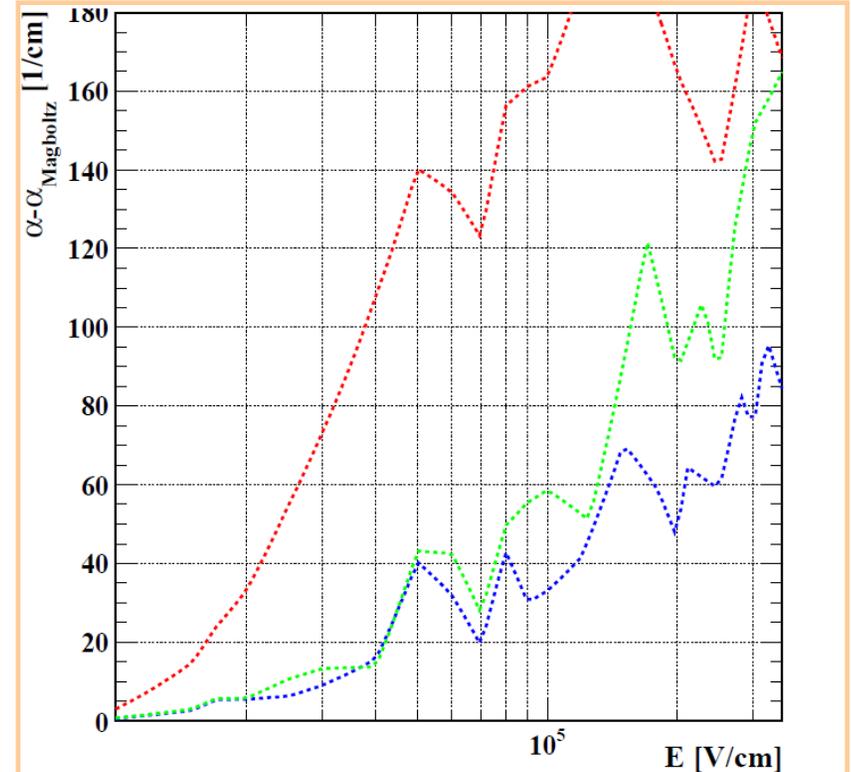
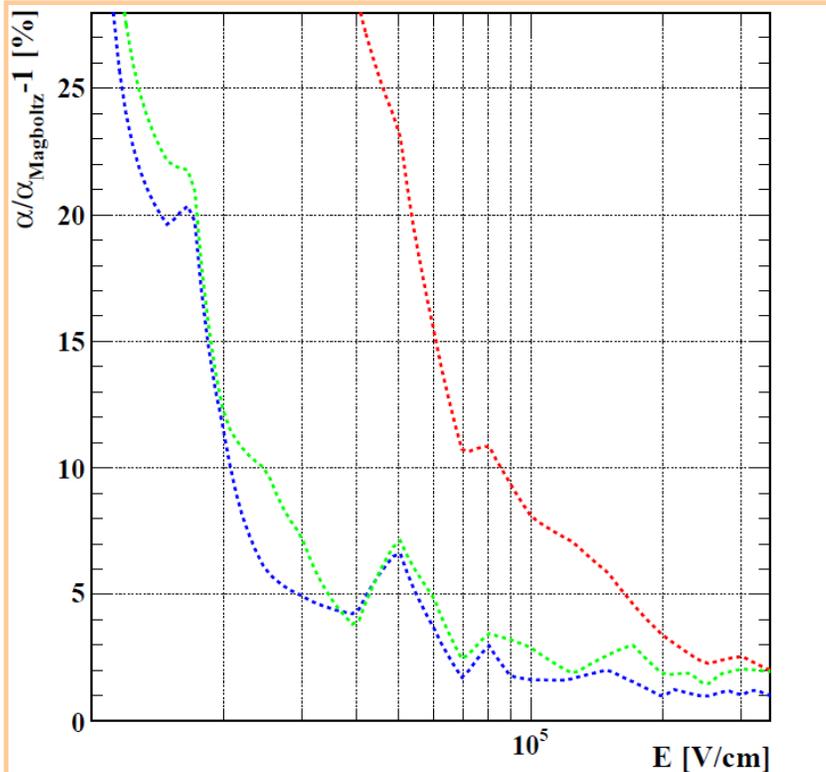
- ❖ Black line: weighted average of 3 independent measurements,
- ❖ Errors on weighted average with band.

Comparisons of cross sections



- ❖ Dashed green line: differences between R.C. Wetzel et al. Magboltz 8.9.3
- ❖ Dashed brown line: differences between R. Rejoub & Magboltz 8.9.3

Comparison of Townsend Coefficients



❖ Xe 98 % - CH₄ 2 % mixture; $p_{\text{gas}} = 1$ atm, $T_{\text{gas}} = 300$ K.

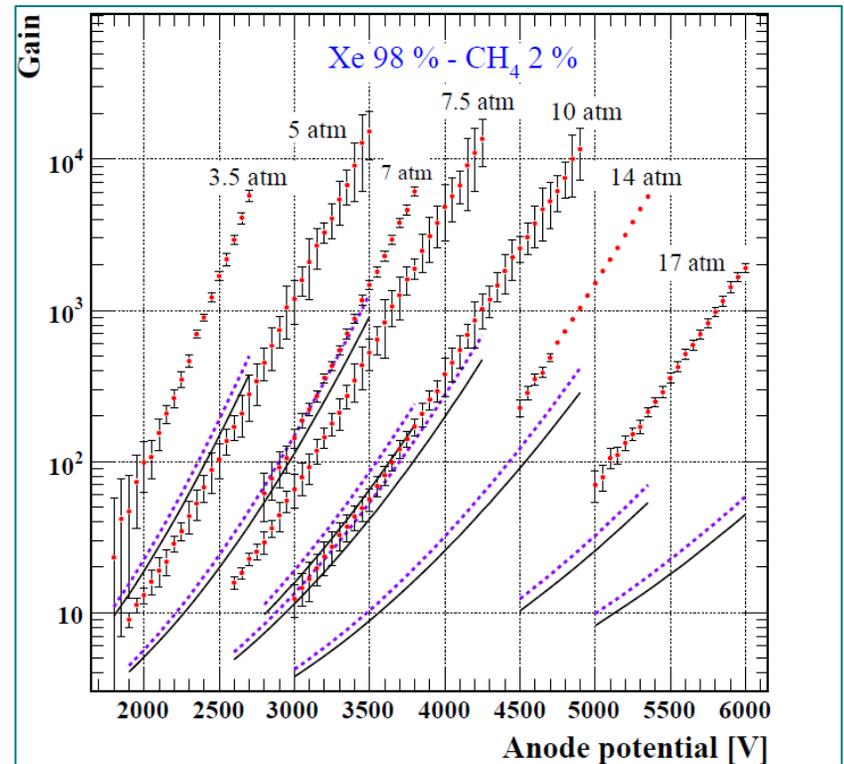
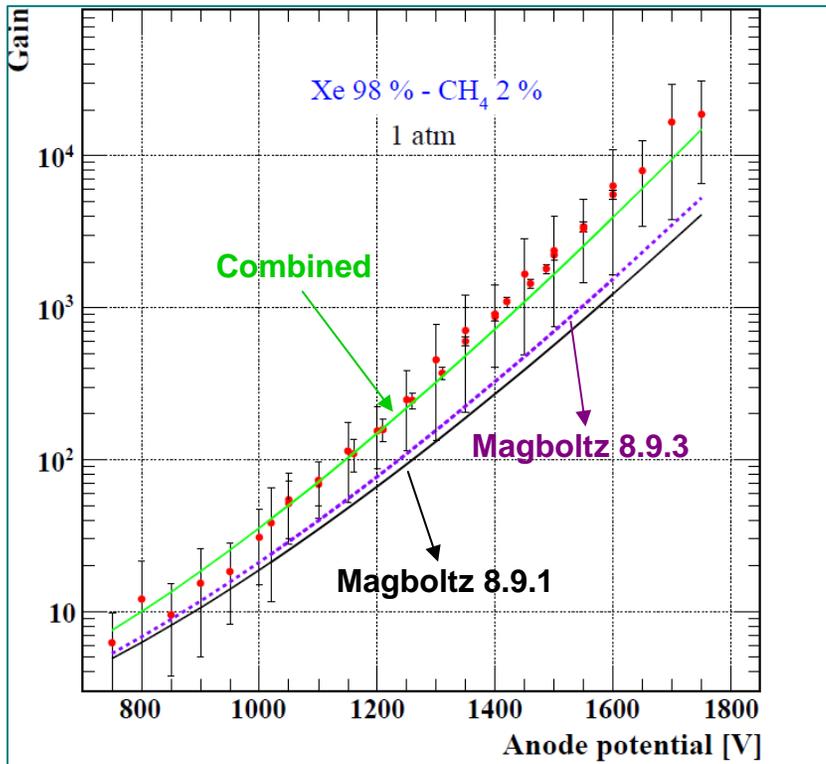
❖ 3 different cross sections in Magboltz data:

❖ Blue: Magboltz 8.9.3;

❖ Red: full R. Rejoub et al.;

❖ Green: combined D. Rapp and P. Englander-Golden, R. Rejoub et al.

Xenon – Methane Mixtures



- ❖ Some kind of agreement at 1 atm (at low gains),
- ❖ No agreement at higher pressures than 1 atm even with updated Magboltz,
- ❖ Separations increase with pressure !
 - ❖ Additional processes could happen ?