KSe3 @ KLOE-2

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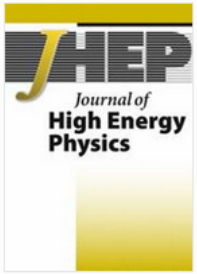
A_S on data 2004-2005



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Measurement of the charge asymmetry for the $K_S \to \pi e \nu$ decay and test of CPT symmetry with the KLOE detector

Authors Authors and affiliations

The KLOE-2 collaboration, A. Anastasi, D. Babusci, M. Berlowski, C. Bloise, F. Bossi, P. Branchini, A. Budano, B. Cao, G. Capon, F. Ceradini, P. Ciambrone, F. Curciarello, E. Czerwinski, G. D'Agostini, show 46 more

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Details of $\phi \to K_L K_S \to K_L(crash)\pi e\nu$ selection

1. K_L crash selection
   - K_L cluster energy $> 100 MeV$,
   - $0.17 < \beta_{cr} < 0.28$
2. Preliminary selection
   - cuts on fiducial volume: $|z_{vtx}| < 5cm$, $\rho_{vtx} < 5cm$
   - $300 < M_{inv} < 490$ MeV,
   - $70^\circ < \alpha < 175^\circ$
3. Time Of Flight analysis

$$\delta_t(m_x) = t_{cl} - L/(c \cdot \beta(m_x)), \qquad d\delta_{t,ab} = \delta_t(m_a)_1 - \delta_t(m_b)_2.$$

   - cut on $d\delta_{t,\pi,\pi} < 1.5ns$
   - particle identification,
     - electron is the first track , $|d\delta_{t,e\pi}| < 1.3 \wedge d\delta_{t,\pi e} < -3.4$
     - pion is the first track, $d\delta_{t,e\pi} > 3.4 \wedge |d\delta_{t,\pi e}| < 1.3$
   - fixing global $T0$
   - 'circle cut': $(\delta_t(e) - 0.07)^2 + (\delta_t(\pi) - 0.13))^2 < (0.6)^2$
4. cut on β_{new} with recalculated T0 from TOF $0.20 < new\beta < 0.225$
   $\Uparrow$ applied only for KLOE-2 data
5. normalization of the $M^2(e)$ MC distribution to the data

Details of the selected data sample

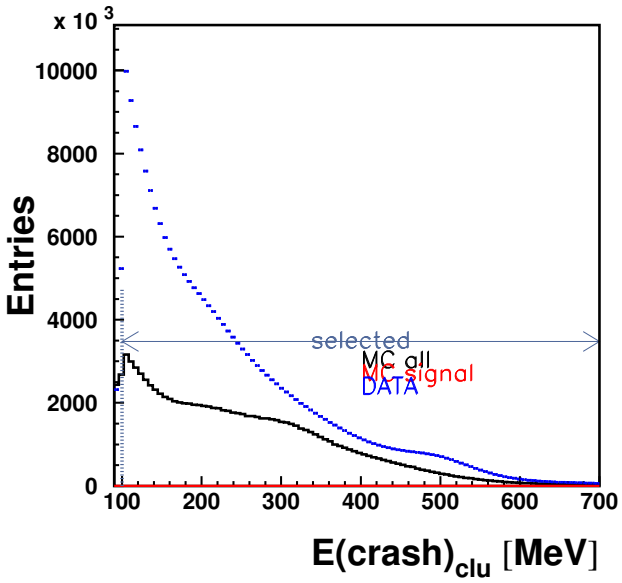
KLOE data

- run numbers: 30300-41902 (details in memo)
- DBV: 26
- data stream: 42
- luminosity: 1.63 fb^{-1}
- MC with LSF=1

KLOE-2 data

- run numbers: 86512-86900; 86025-86511; 85681-86013
- DBV: 38
- data stream: 2
- luminosity: 238.89 pb^{-1}
- MC with LSF=1

Taken data runs with corresponding MC



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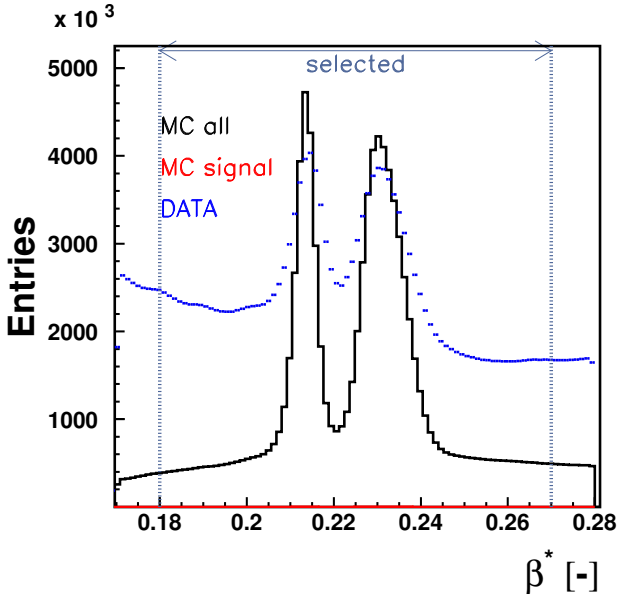
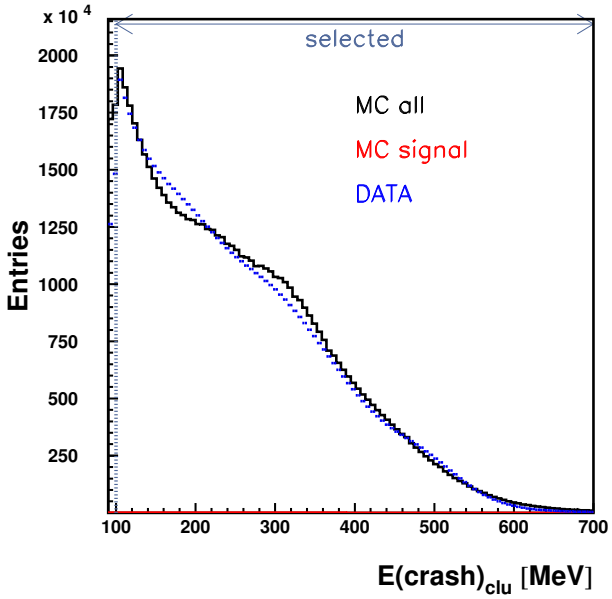
2014-2018





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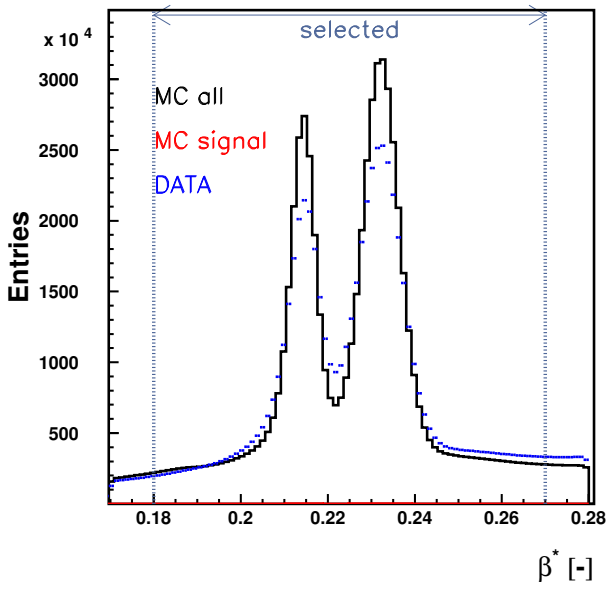
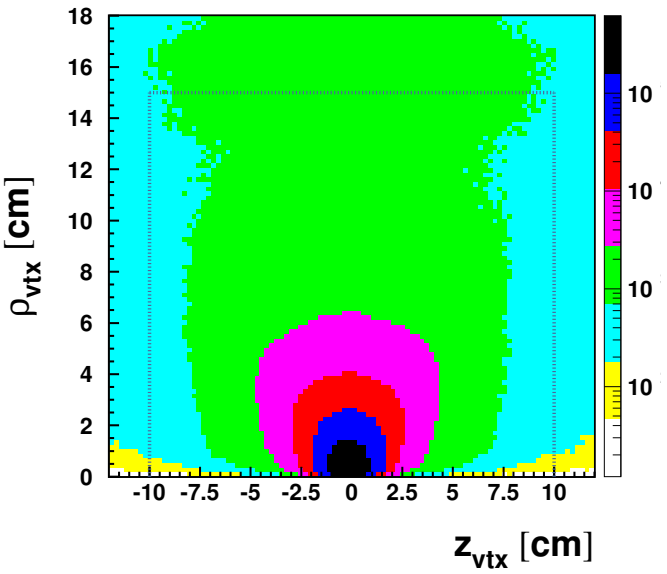
2004-2005





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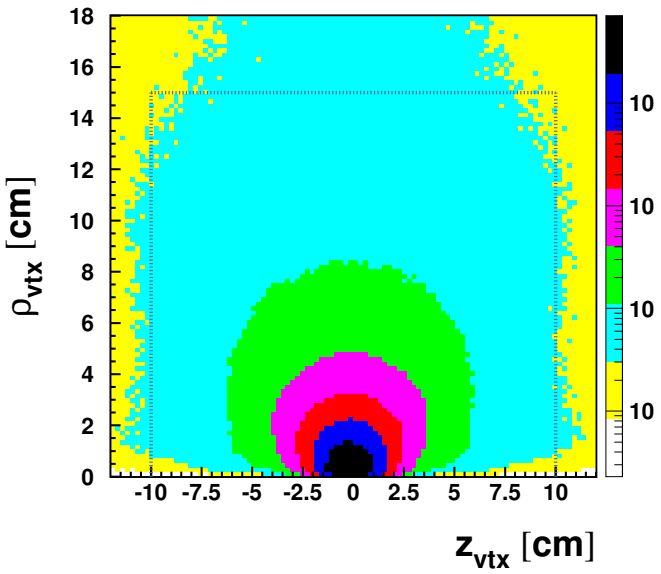

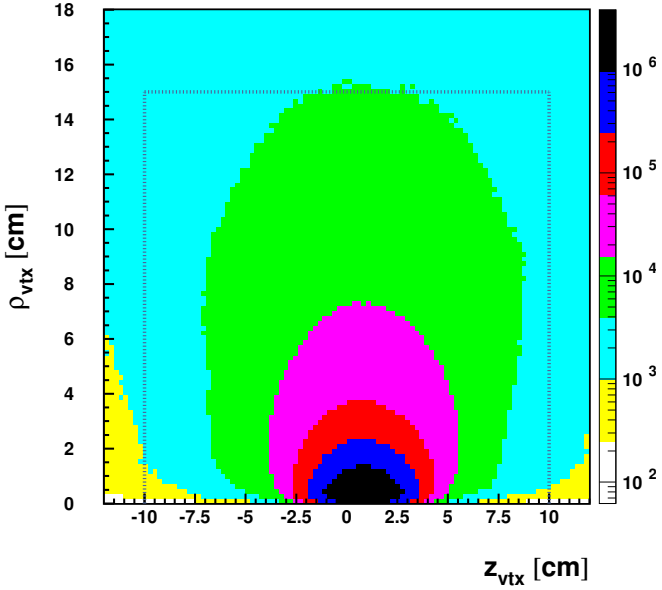

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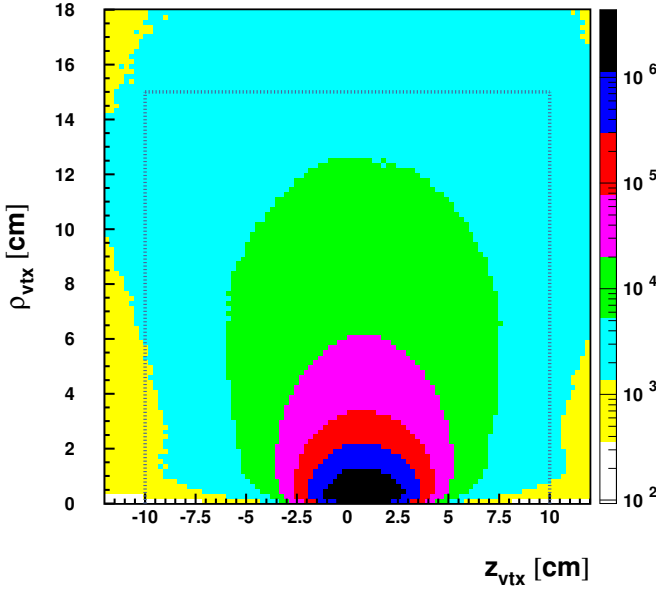
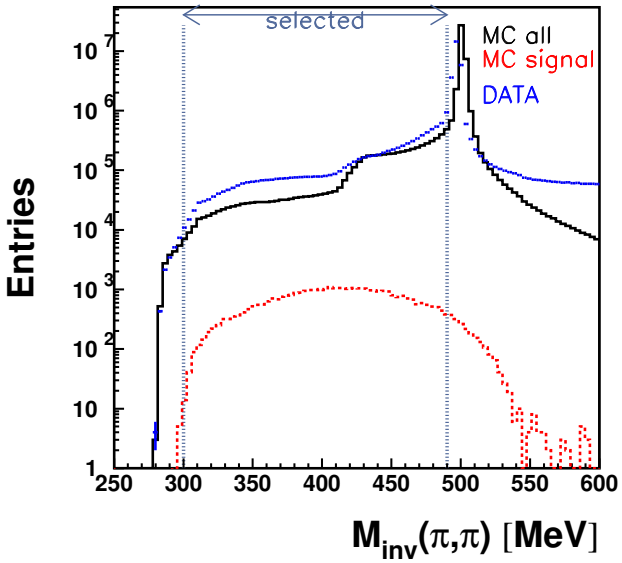


$\Uparrow$ **data** $\Uparrow$ **mc**



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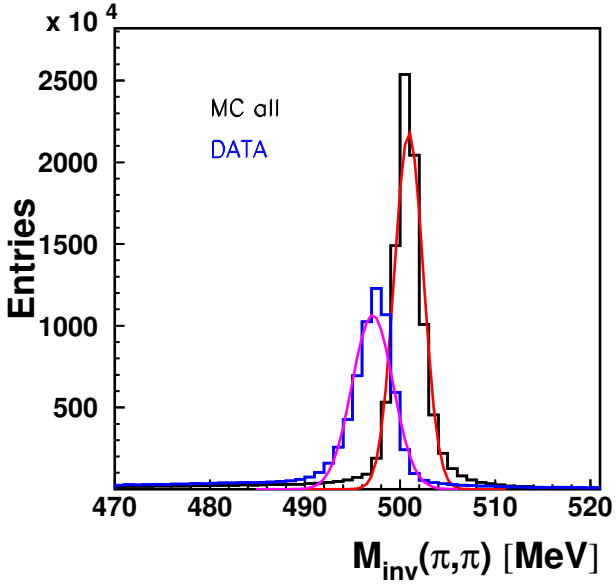

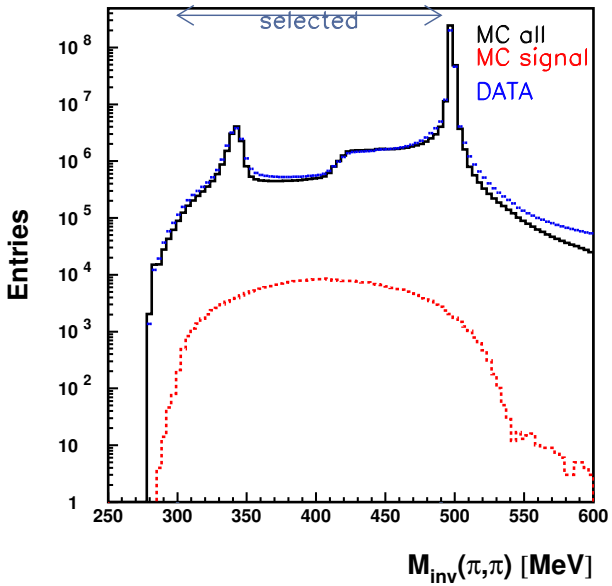

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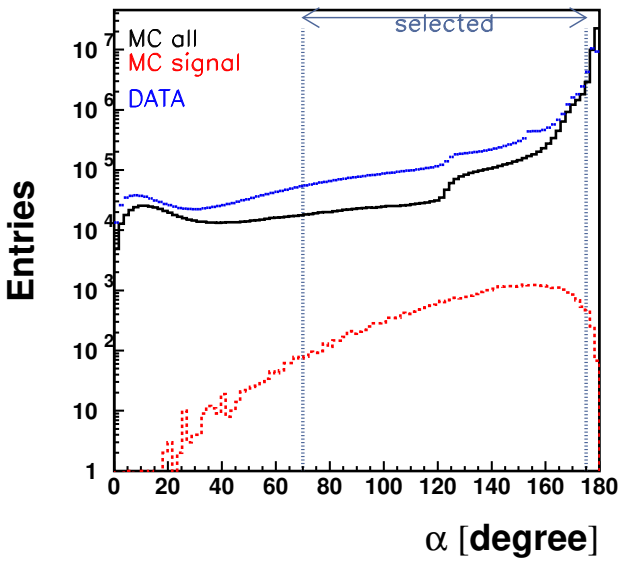
2004-2005

FIT DATA $\Uparrow$

param	value	error
Constant	0.10647E+08	1868.8
Mean	497.10	0.27295E-03
Sigma	2.1500	0.29856E-03

FIT MC $\Uparrow$

param	value	error
Constant	0.21831E+08	3406.9
Mean	500.91	0.16699E-03
Sigma	1.5262	0.16889E-03



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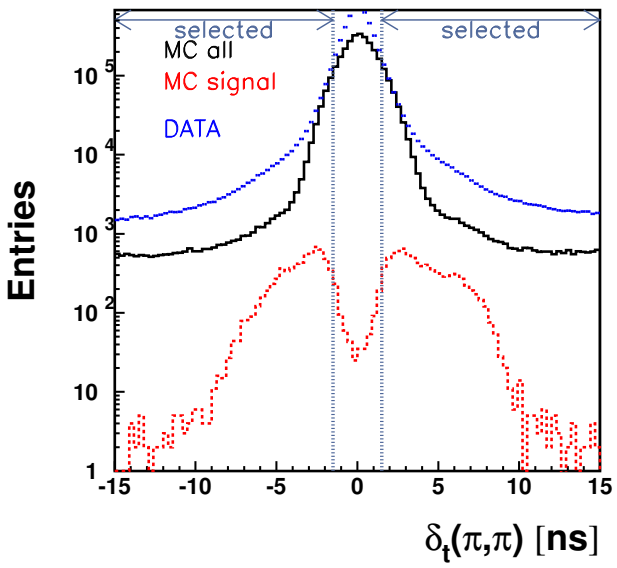

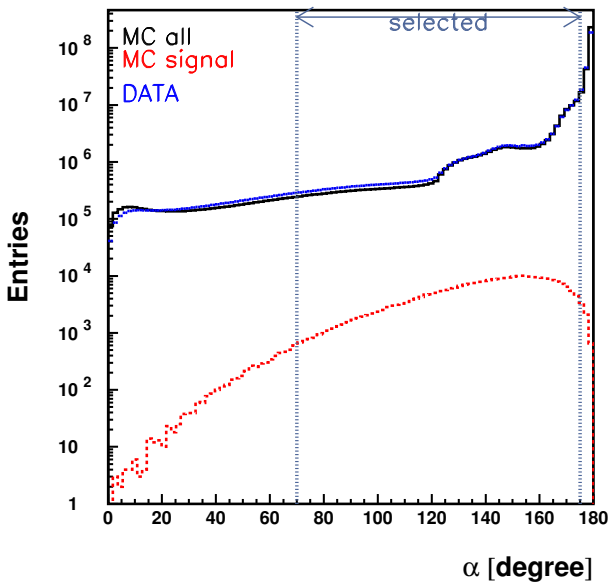

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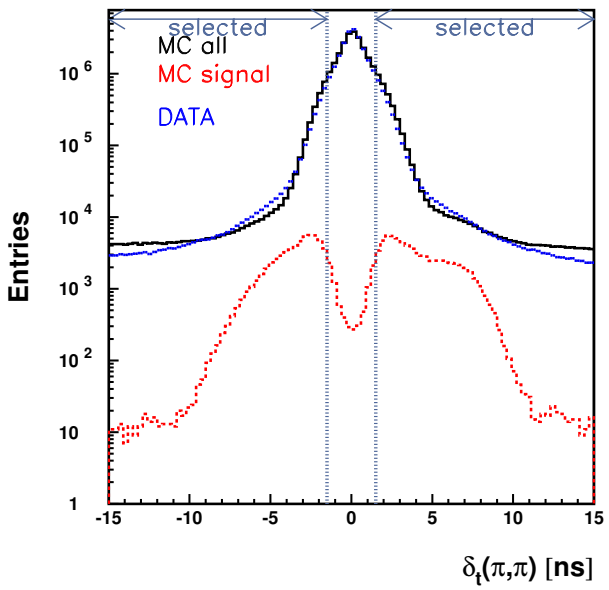

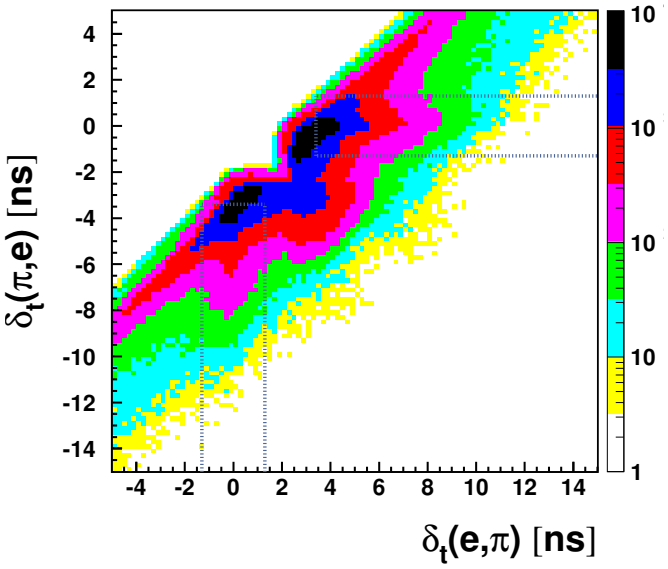

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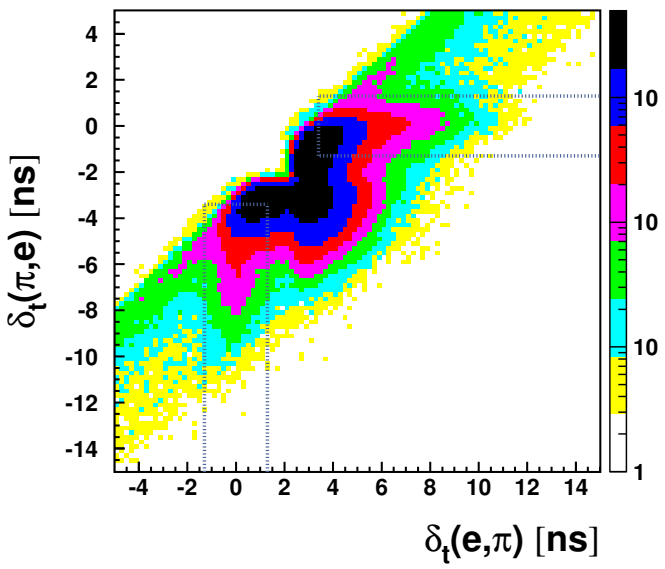

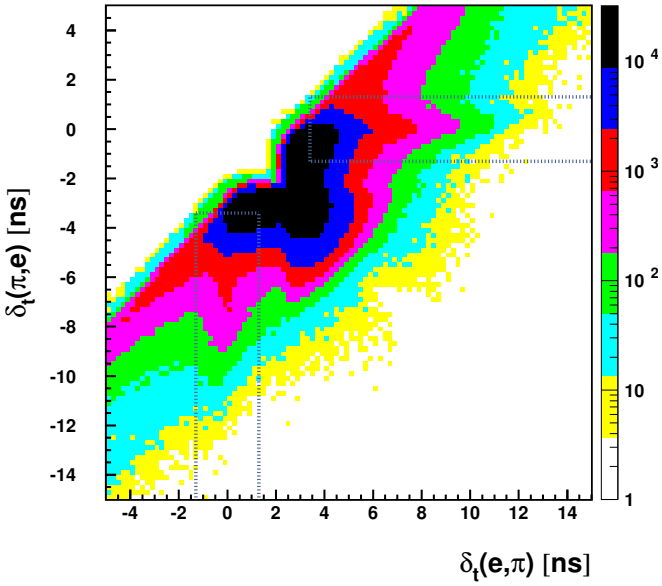

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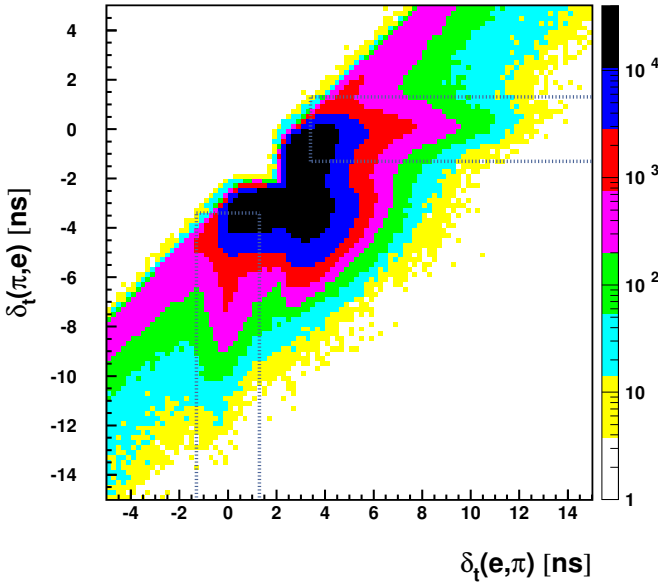

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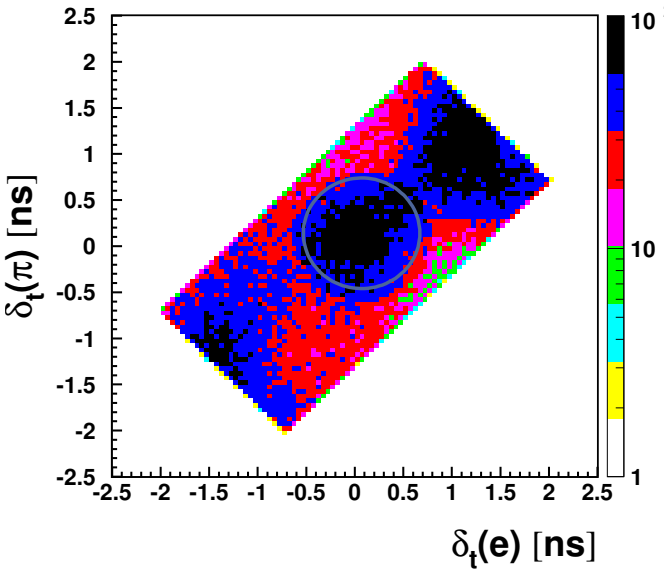

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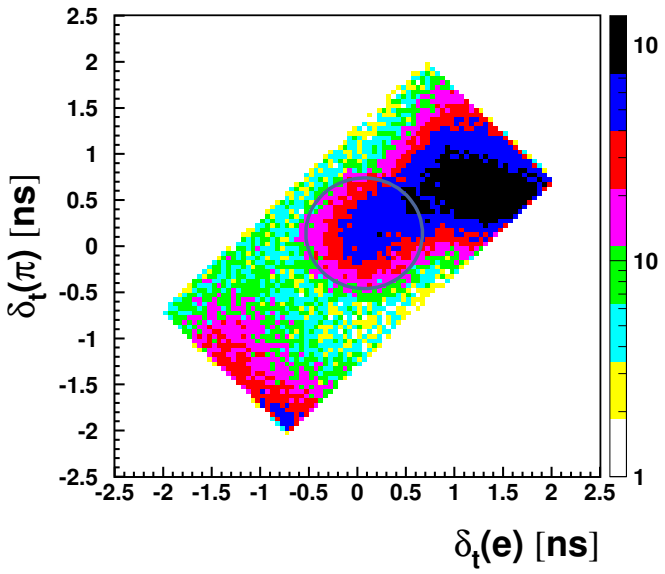

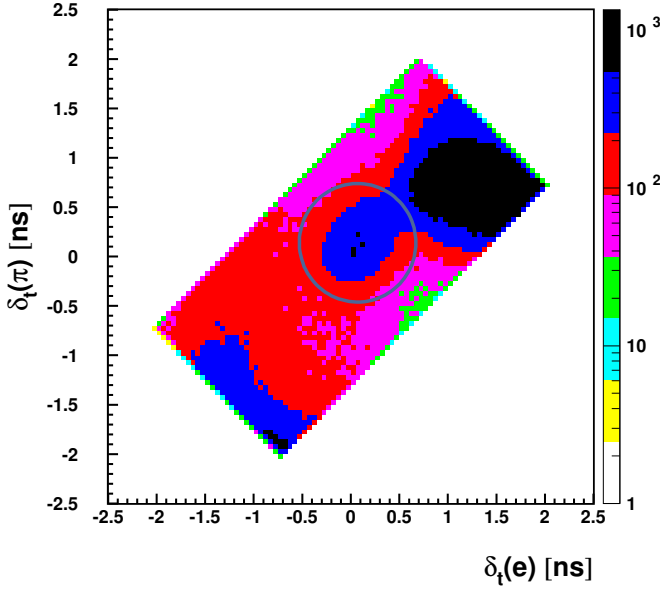

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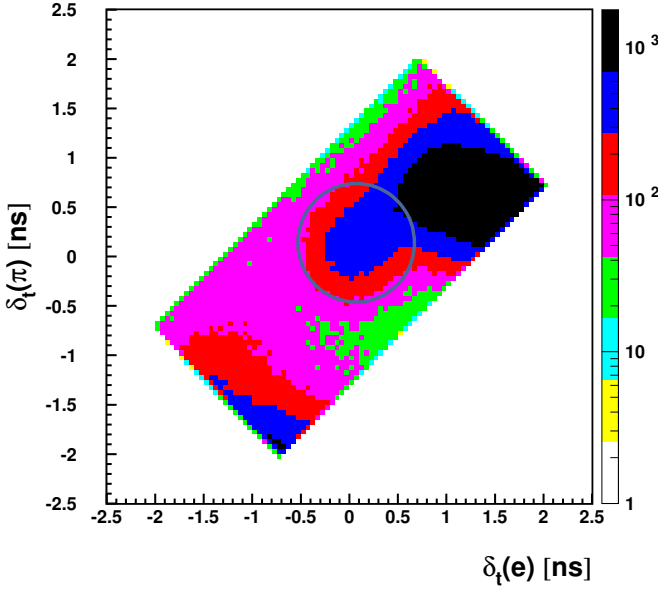

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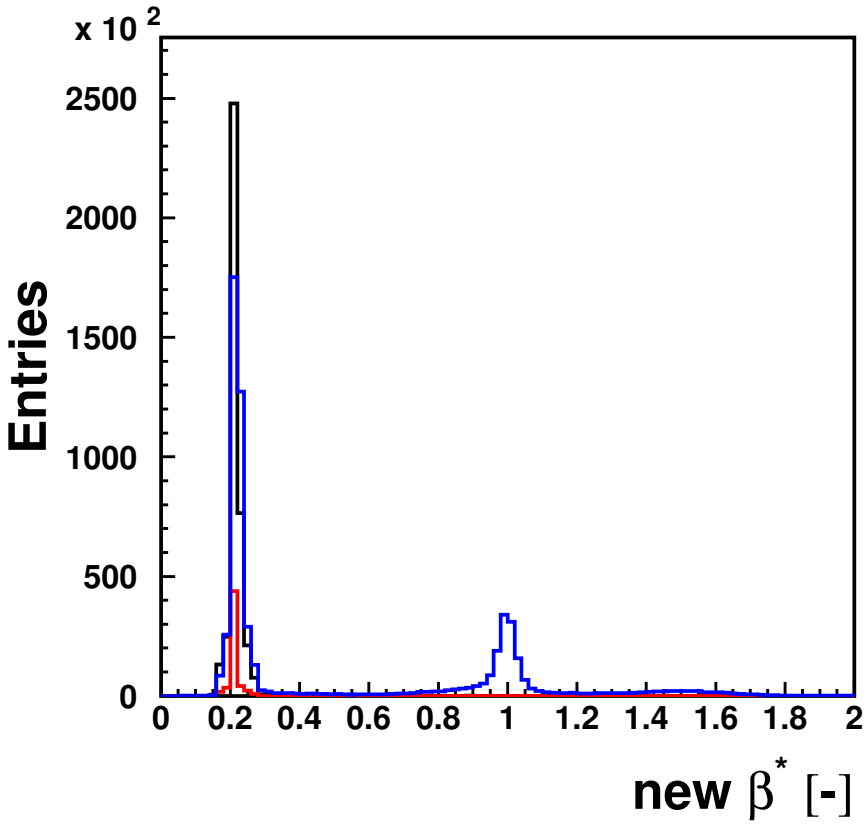
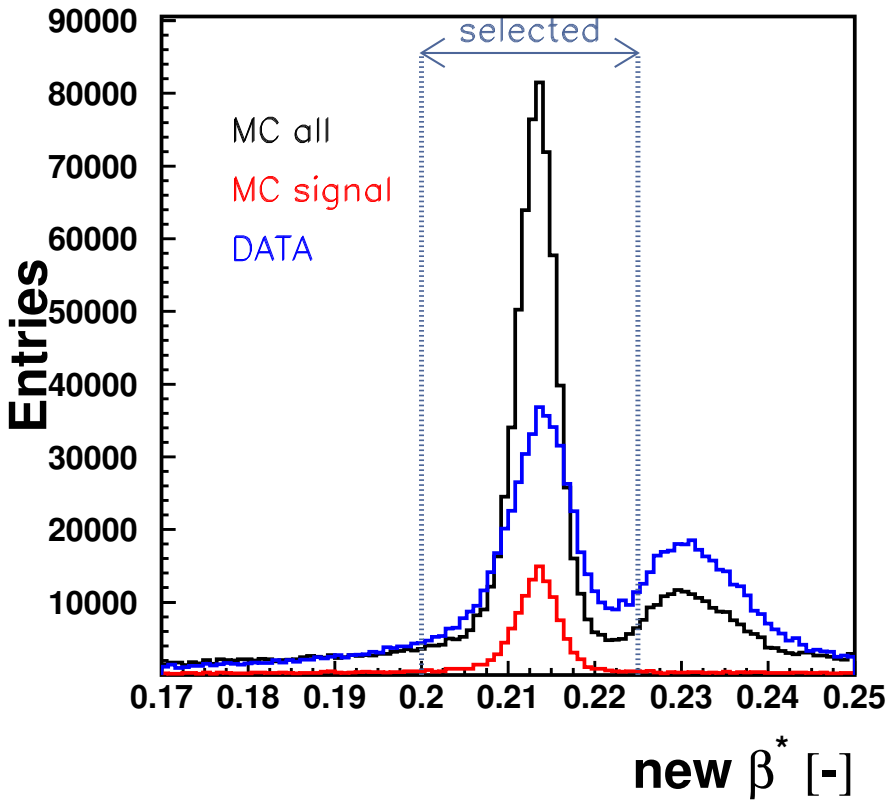
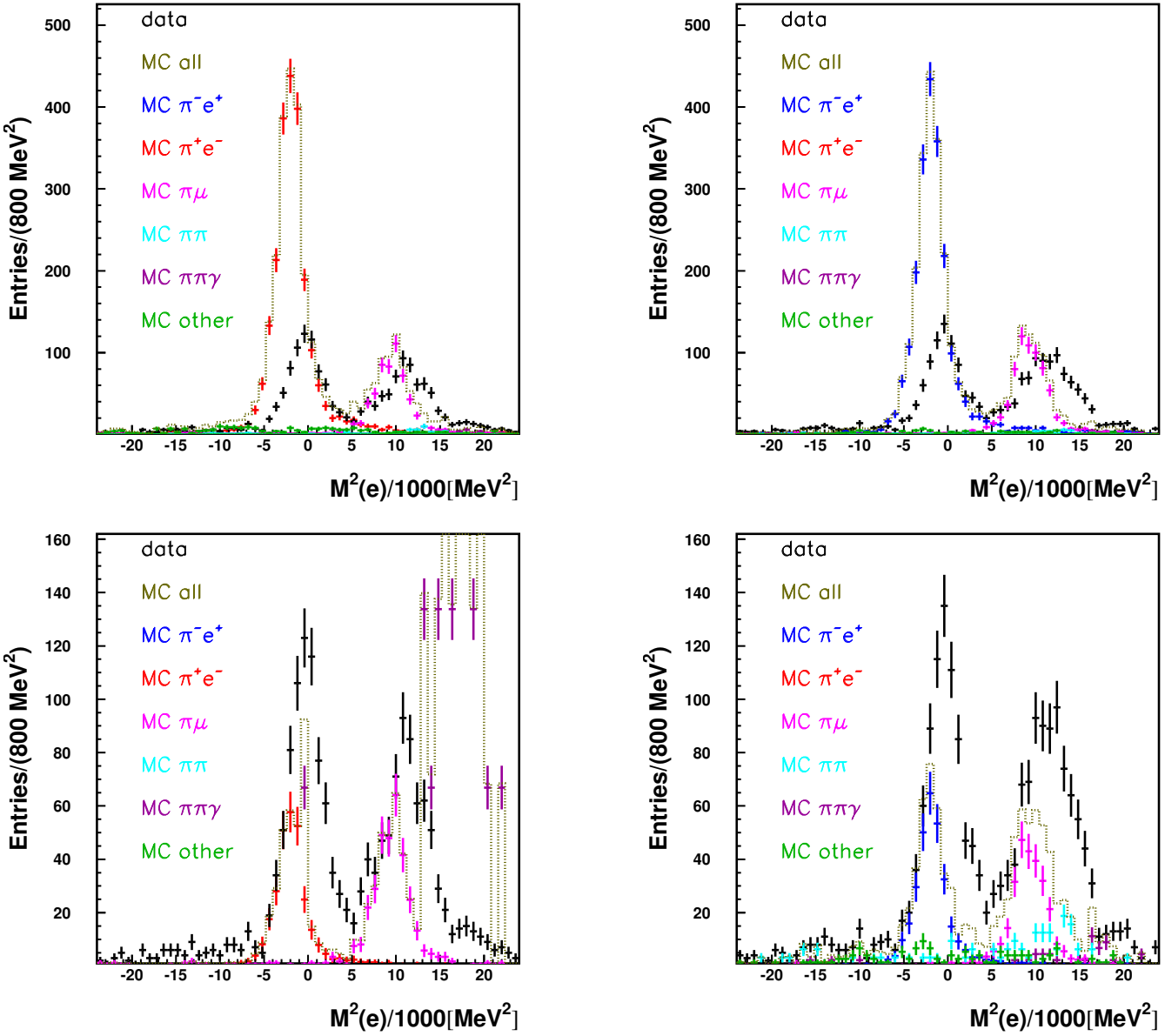




- step preformed only for KLOE-2 data
- after pion and electron identification the T0 is evaluated
- the K_L velocity is recalculated
- right figure is a zoom of the left one (take a look on the scale)

BEFORE FIT⇒

AFTER FIT⇒



Normalization preformed in the same way as in KLOE data

Plans

- work on shift in MC (visible at $M_{inv}(\pi, \pi)$ and $M^2(e)$)
  - feature connected with IT - working with IT group to solve it
- reduce background and events to analyze - change cuts on E_{clu}, β^* and vertex position

Thank you for your attention