### Bulge Proper Motions Based on the OGLE-III Data

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#### NGC3390 – example X-shaped structure



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Bureau i in. 2006

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### Double Red Clump

 $l = 0.5^{\circ}, b = -3.1^{\circ}$ 

13 13 14 14 [60w] / [60m] / 16 16 17 17 18 18 1.5 2

(V-1) [mag]

 $l = 0.2^{\circ}, b = -5.0^{\circ}$ 



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Bulge proper motions

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# Luminosity function



# Luminosity function



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## Fields observed by the OGLE-III survey



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#### Comparison of proper motions and probabilities



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Bulge proper motions

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#### Proper motion difference of two arms



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$$\Omega = \mu_{Sgr\,A*,I\star} + \frac{5\Delta\mu_{I\star}^{const}}{\ln 10\Delta I_{RC}} = -87.9 \pm 8.2 \text{ km s}^{-1} \text{ kpc}^{-1}$$

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- The catalog of proper motions in whole OGLE-III bulge area is constructed.