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# The Local Bubble in the interstellar medium and the origin of the low energy cosmic rays

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## Abstract

An analysis of the energy spectra of cosmic rays and particularly the precise data from the AMS-02 experiment support the view about the important role of the Local Bubble in the nearby interstellar medium. It is suggested that the bulk of CR below about 200 GV of rigidity (momentum/charge ratio) comes from the modest number of supernova remnants in the Local Bubble which appear to have occurred some  $10^6$  years ago and contributed to its formation. At higher rigidities the contribution from a 'Local Source', a single supernova remnant generated some  $10^5$  years ago seems to dominate up to, at least 1000 GV.

**Keywords:** cosmic rays, local bubble, energy spectrum

## 1 Introduction

The origin of cosmic rays (CR) is still subject of some doubt, although supernova remnants (SNR) appear to play an important part, at least to several PV (Ginzburg and Syrovatskii, 1964 and many other publications). Recent precise measurements of the rigidity spectra of protons and helium nuclei, the positron fraction, the antiproton to proton ratio and preliminary data on the rigidity spectrum of lithium and boron to carbon ratio (Ting for AMS-02 coll., 2015) all support the previous view (Erlykin and Wolfendale, 2013, 2015a,b; Tomassetti, 2015a,b; Kachelriess et al., 2015) that there is a large contribution to the intensity from a nearby, recent SNR above 200 GV, particularly for the secondary nuclei (Erlykin and Wolfendale, 2016a; Tomassetti, 2015a,b).

We turn now to rigidities below 200 GV where earlier we proposed that a 'New Component' dominates (Erlykin and Wolfendale, 2012). This idea has been put forward

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