

# Electron Momentum Density in Europium Using a $^{137}\text{Cs}$ Compton Spectrometer

Babu Lal Ahuja<sup>a</sup>, Harsh Malhotra<sup>b</sup>, and Sonal Mathur<sup>a</sup>

<sup>a</sup> Department of Physics, College of Science Campus, M. L. Sukhadia University,  
Udaipur - 313001 (Raj.), India

<sup>b</sup> Department of Physics, G.D. Govt. Girls College, Alwar - 301001 (Raj.), India

Reprint requests to Dr. B. L. A.; E-mail: blahuja@yahoo.com

Z. Naturforsch. **60a**, 512 – 516 (2005); received December 17, 2004

The isotropic Compton profile of europium, the most reactive lanthanide, has been measured at a resolution of 0.40 a.u. using 661.65 keV gamma-rays. In the absence of a band structure-based Compton profile, the experimental data are compared with renormalised-free-atom (RFA) and free electron models. It is seen that the RFA model with  $e^-$ - $e^-$  correlation agrees better with the experiment than the free electron models. The first derivatives of the Compton profiles show the hybridization effects of s-, p-, d-, f-electrons. From our RFA data we have also computed the cohesive energy of europium.  
PACS: 13.60.F, 71.15.Nc, 78.70. -g, 78.70.Ck

*Key words:* Compton Profile; Electron Momentum Density; Lanthanides; Cohesive Energy.