

## (4) البحث الرابع

**Title:** “The evaluation of the 1001.03 keV gamma emission absolute intensity using fundamental parameter method.”

### **Journal**

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### المخلص باللغة الإنجليزية

The accurate evaluation of the absolute intensity of the gamma-ray transition 1001.03 keV of  $^{234m}\text{Pa}$  is crucial for accurate determination of  $^{238}\text{U}$  in nuclear material and environmental samples. Over the last decades, a wide range of 1001.03 keV absolute intensity values were published by different researchers and ranged from 0.59 to 1.12%. Nowadays, one of the most commonly used values is  $0.847 \pm 0.008\%$  that seems not accurate and would eventually lead to an overestimation of  $^{238}\text{U}$  activity concentration. The absolute intensity of 1001.03 keV gamma transition was re-evaluated using different fundamental parameter method (FPM) modes, uranium ore and granite samples, samples' geometries, sample-to-detectors' geometries and gamma ray spectrometers. The mean  $\pm$  standard deviation of newly optimized absolute intensity value is  $1.067 \pm 0.084\%$  with an average relative bias of - 20% from the commonly used value.