

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**The Role of Hyperspectral Imaging in the Visualization of Obliterated Writings** HINA AYUB, Oak Ridge Institute for Science & Education- FBI Laboratory Research Division, DIANE WILLIAMS, FBI Laboratory Research Division — The forensic questioned document community has encountered difficulty visualizing obliterated writing using conventional methods. Cases have been reported in which pencil obliterated by ink, and ink obliterated by ink, cannot be discerned visually. Conventional methods for visualization of obliterated writings do not adequately visualize writing when obliteration is made with the same color ink, or when graphite pencil writings are obliterated by ink. We report the use of hyperspectral imaging to successfully view obliterated writings in which a “true black” ink obliterated graphite as well as graphite/graphite and ink/ink obliterations. Hyperspectral imaging (HSI) is a novel optical technique in which hundreds of narrow contiguous bands, over a large range of wavelengths, can be viewed to yield a complete spectral profile at each pixel in the image. HSI has evolved as the product of conventional two-dimensional imaging and spectroscopy. The resultant image of HSI is a three-dimensional data cube, with the pixels constrained to a single plane, and the complete reflectance spectra seen along the orthogonal axis. We used three types of hyperspectral imaging systems, which provided a wavelength range spanning approximately 300-1700 nm, to visualize the obliterated writing samples. Additionally, we will present data obtained from the use of thermal imaging to successfully view obliterated writings.

Hina Ayub  
Oak Ridge Institute for Science & Education  
FBI Laboratory Research Division

Date submitted: 22 Nov 2005

Electronic form version 1.4