

ultraviolet light, and the edge of the spot is light blue-purple. Spots of other human secretions, such as sweat spots, urine spots, vaginal secretions, breast milk, nasal mucus, etc., as well as soap, paste spots, certain drugs, chemical fiber products, can also appear similar to sperm spots under ultraviolet light of Fluorescence. The appearance of silver-white fluorescence under ultraviolet light is not a specific reaction of sperm spots and cannot be used as a basis for determining sperm spots. In addition, ultraviolet light causes great damage to human skin and eyes. Excessive application of ultraviolet light on the spot is not recommended. At the same time, the power of ultraviolet light is generally relatively small, and the excitation efficiency for trace material evidence is relatively low. For lasers, lasers in the visible wavelength range can be selected, such as 445nm laser or 532nm laser as the excitation light source. With eye protection, the visible wavelength laser will not cause damage to the human body. The laser's monochromaticity and high brightness, the efficiency of exciting fluorescence is much higher than other light sources, especially for the search of trace residues in body fluids. The laser shows its unique optical characteristics.

Excitation of blood traces with commonly used visible light lasers often fails to obtain the fluorescence effect that can be observed with the naked eye. The human blood is mainly composed of blood cells and plasma, and the corresponding endogenous fluorescent substances are derived from the endogenous porphyrin, tryptophan, reduced nicotinic adenine dinucleotide (phosphate) and flavin in the blood. Adenine dinucleotide. The fluorescence excitation efficiency of these substances shows a significant difference with the change of the wavelength of the excitation light. In the visible light band, the excited blood fluorescence is very weak and cannot be directly observed with the naked eye. The use of lasers to search for blood stains at the scene is mainly to search for blood stains on some fabrics with complicated patterns, such as clothes, sheets, sheets, etc. On the one hand, the difference between blood stains and fabric materials is used, and there are differences in the absorption and reflection of lasers. As a result, blood stains are found. On the other hand, the fabric itself tends to emit visible fluorescence under the excitation of the laser, forming a difference between the blood stains and the fabric to realize the positioning of the blood stains.



Fig. 1 Use 445nm laser to visualize traces of fine spots on white furniture

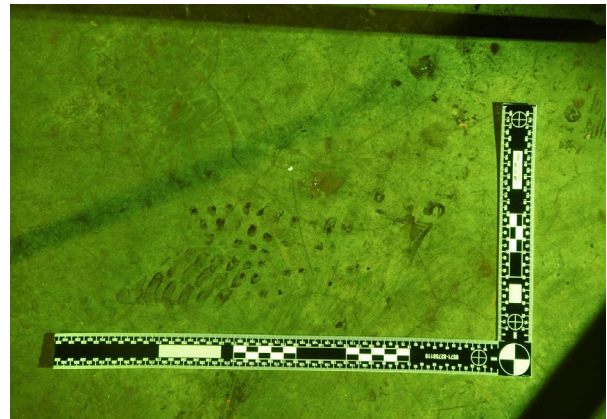


Fig. 2 Use 445nm laser to visualize blood footprint on cement floor

ACKNOWLEDGMENTS

Supported by the Opening Project of Chongqing Institutes of Higher Education Key Forensic Science Laboratory (Southwest University of Political Science and Law) (XKZDSYS2019-Y7). The authors would like to acknowledge the constructive comments given by the anonymous reviewers.

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Conflicts of interests

The copyright remains in the research group of *The Research on Efficient Discovery of Biological Evidence Traces in Crime Scene Investigation*.