

## VII Leopoldo García-Colín Mexican Meeting on Mathematical and Experimental Physics



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### **ARTURO ROBLEDO: Effect of the sample's temperature on the line emission in laser ablation at cryogenic temperatures.**

*Wednesday, 19 February 2020 16:00 (45 minutes)*

We report results obtained in a laser-ablation experiment using targets chilled down to 20 K. In a previous work, our co-workers found that by increasing the temperature of the target above room temperature the emission of the lines increased in proportion to the target's temperature [1]. In the present work we applied the focused beam of a pulsed, nanosecond Nd:YAG laser on a metallic surface that is in contact with the cold finger of a He refrigerator. In this way the sample's temperature could be varied in the interval 20-290 K. The sample and the cold finger were kept in a high vacuum in order to obtain good thermal insulation. In the present work we noticed a slight increment in the emissivity of the lines as the temperature increased. The most notable effect however, one that was unexpected, is that at low temperatures (~20K) the electron density of the plasma was found to be higher than at room temperature. The explanation for this behavior is attributed to a pre-heating of the target before plasma onset. This is a consequence of the sharp variation of the sample's specific heat with temperature, according to Debye's theory.

#### References

[1] E. Alvarez-Zauco et al, Applied Physics B 108 (2012) 867–873.

**Session Classification:** SHORT TALKS

**Track Classification:** SYMPOSIUM ON LASER ABLATION