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**THE TUNABLE VIBRONIC LASER MATERIALS BASED ON TRANSITION METAL IONS :
SEARCH OF NEW SYSTEMS AND EXCITED STATE SPECTROSCOPY**

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For they are stable and they allow to get intense and tunable radiations in a large spectral domain, the vibronic solid state laser materials based on transition metal ions such as Ti^{3+} , Cr^{3+} , V^{2+} , Ni^{2+} and Co^{2+} give rise presently to a renewed and increased interest, and more particularly in our laboratory as concerns the optical studies.

In this presentation, a first part is dealing with the description of the active medium and the working basis of this type of laser, by showing, for example, the importance of the thermal effects on the laser characteristics. We will also point out briefly on the state of the art of these laser materials.

A second part will be devoted to the description of our specific aims : search of new systems,⁽⁺⁾ classical as well as elaborated optical studies such as measurements of fluorescence quantum efficiencies and measurements of excited-state absorption cross sections, modelization of the dynamical processes, optimization of the laser performance and use of the best systems in appropriate optical cavities.⁽⁺⁺⁾

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⁺⁺ thanks to a DRET Grant 84/071