

## **Statistical variation of particles in the interior air**

*Antoine TABET, Ziad ADEM, Antonio KHOURY*

*Laboratoire de Physique Appliquée, Université Libanaise, FSII*

E-mail : [antoinetabet@ul.edu.lb](mailto:antoinetabet@ul.edu.lb)

### **Abstract:**

Until the year 2000, a few number of studies related to the indoor particular pollution were conducted; for example, in France the first studies were carried out in the early 90s, in some public establishments such as schools. In 2001, (Mosqueron.L, and Nedellec.V) published a paper on the quality of the interior air that related several studies realized in this domain; these different studies confirmed the existence of interior sources of particles. It is to be noted that the limit values of total particle emissions in the interior air were fixed at  $1 \text{ mg/m}^3$  for the fibers and at  $50 \text{ mg/m}^3$  for the total dusts (Bicocchi. S et Hospitalier. C 1998).

These particles have a negative impact on the health. Indeed, these particles cause specific problems, mainly due to the selectivity of the inhalation and the deposition into the respiratory tracts (occupational safety and health n°174. INRS ND 2098 – 174 – 99). The objective of this study consists of indoor measurements at Lebanese University FSII, to better understand the statistical disposition of polluting particles. The identification and the processing of these collecting particles following the scientific method in force are a must (Bailly. A, et al. BE 9 – 272 – 2001).

The measuring method is direct optic/continuous (Kleitz. A, Boulaud.D. R 2 – 360 – 1995). It is based on the principal of intensity measurement of the scattered light through a particle passing within a light beam (white light or monochromatic). Our working protocol consists of three time measuring per day for three hours along one month and half. The Lebanese university FSII granted us a large panel to study the diversity of the polluting particles and their arrangements in different indoor locations.

The measuring results are coherent compared to the standard values. In fact, the particles of  $0.3 \text{ }\mu\text{m}$  presented around 70 to 79.92 % out of the total number of the existing particles. The particles of  $0.5 \text{ }\mu\text{m}$  ranged between 16 and 17.48 %. The particles of  $1 \text{ }\mu\text{m}$  varied between 2 and 2.59 % whereas those sized  $5 \text{ }\mu\text{m}$  were almost negligible; they varied between 0 and 0.05 %. It is to be noted, that the particles disposition showed that the particles concentration is inversely proportional as function of floor levels.