

From comets to DNA: The impact of ion impact on matter

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Cold astronomical objects such as comets generate, rather unexpectedly, X-rays. Radiotherapy using heavy particles seems superior to cancer therapy using X-rays. These seemingly unrelated phenomena are both driven by similar electronic processes in ion-neutral interactions. In this talk I will give an overview of the current understanding of these processes and their applications. It will be shown that the X-ray emission from comets may be used as a diagnostics of space weather. Concerning radiotherapy, more and more dedicated heavy-particle therapy facilities are taken into operation. However, advancing the understanding of the underlying physics needs novel instrumentation to handle complex biomolecular targets. At KVI we have developed such an instrument that combines electro-spraying, Paul trapping and mass spectrometry.