AbstractID: 13234 Title: Gafgui: an open-source project for radiochromic film dosimetry

Purpose: A code, named Gafgui, is developed to handle most features required for efficient and accurate radiochromic film dosimetry. Gafgui is distributed using the GNU General Public Licence in order to allow the medical physics community to have access to a performing analysis tool and to share algorithms. This could contribute to improving the efficiency of research projects and clinical applications, especially for centers where the access to such tool is limited.
Materials: The code is developed using the Matlab® (The Mathworks, Inc., Boston, MA) platform and is designed for both clinical and research use. Gafgui handles 48-bits tiff images format as well as RIT (Radiological Imaging Technology, CO) images. Single or dual-channel analysis modes are available, to allow analysis of, for example, EBT and EBT2 films (International Specialty Products, Wayne, NJ). A variety of tools are included: image manipulation, an automated film characterization method, an automated method for scanner homogeneity correction as well as a complete uncertainty analysis of film response based on a recent exhaustive study of realistic uncertainties in EBT film dosimetry, suitable for clinical or research applications. Data analysis include average dose over a region of interest as well 1D and 2D-distributions.
Results: In our center, the development of Gafgui has allowed improving the workflow in radiochromic film dosimetry. It has also enabled the implementation of IMRT dose verifications as well as research in nonstandard beams reference dosimetry. The code design shows great potential for developing applications, since users are allowed to modify or add features as they wish and share it with other users. Future developments will be accessible in regularly updated versions and available to the medical physics community.