



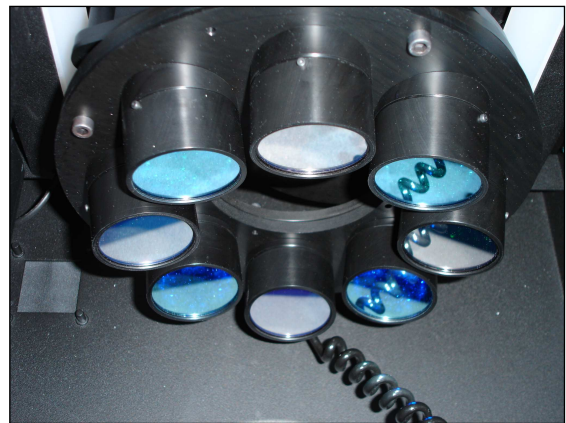
An innovative Fluorescence excitation system for AEQUORIA

The Luxiflux is an excitation system for fluorescence, using LEDs. The most interesting asset of this light source is the high illumination homogeneity and brightness it could provide. The Luxiflux can be used at two wavelengths: 470nm (Blue) and 633nm (Red). Other wavelengths are also available, on demand, thanks to interchangeable LED plots.

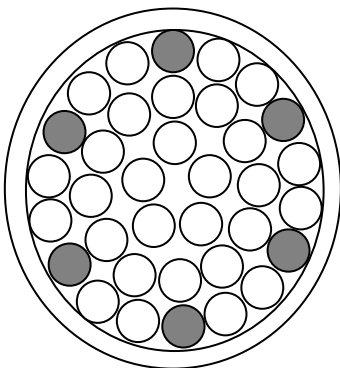
Let's describe further the system...

- The Luxiflux consists in 8 modules: 4 red (633nm) and 4 blue (470nm). Each module has 35 LEDs. These LEDs are laid out in 3 circles, with 18, 12 and 5 LEDs. The intensity of illumination depends on the number of LEDs switched on.

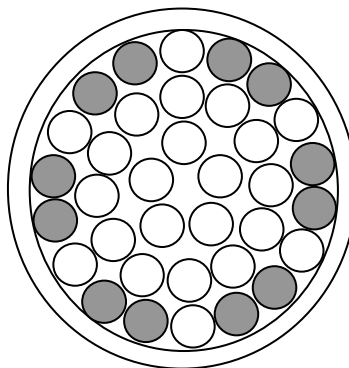
The different intensity positions are described below.



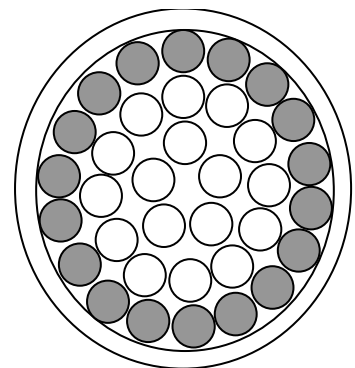
The Luxiflux set in the Darkbox



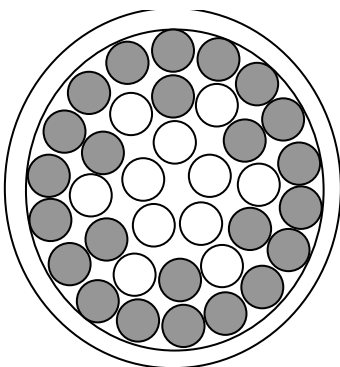
Position 6



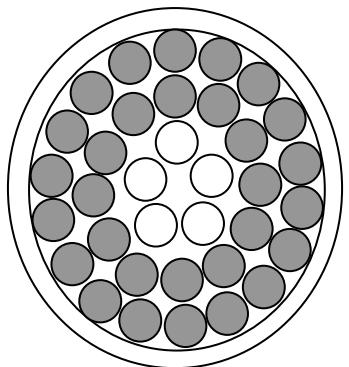
Position 12



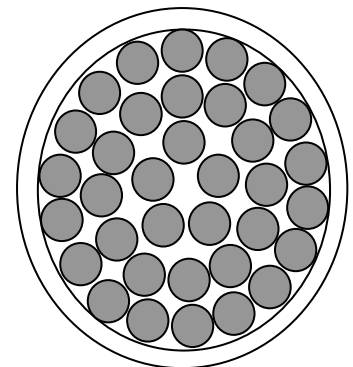
Position 18



Position 24



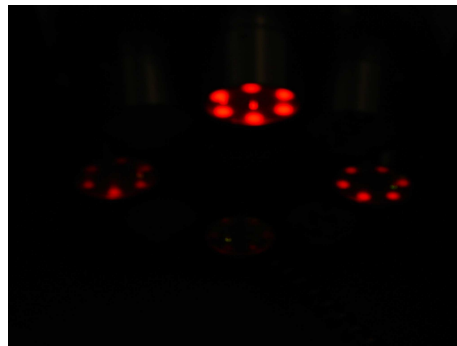
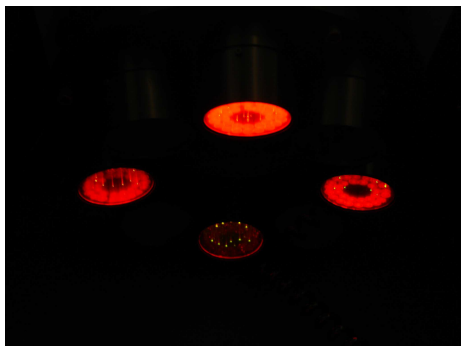
Position 30



Position 35



- The emission filter wheel has 3 different positions, marked by 3 coloured points. Red, blue and white, for the position without filter. The red emission filter is a RG665 long pass filter. The blue one is a band pass filter (520DF40) combined with a long pass filter (OG515).



The Luxiflux at 2 different intensity wavelength settings

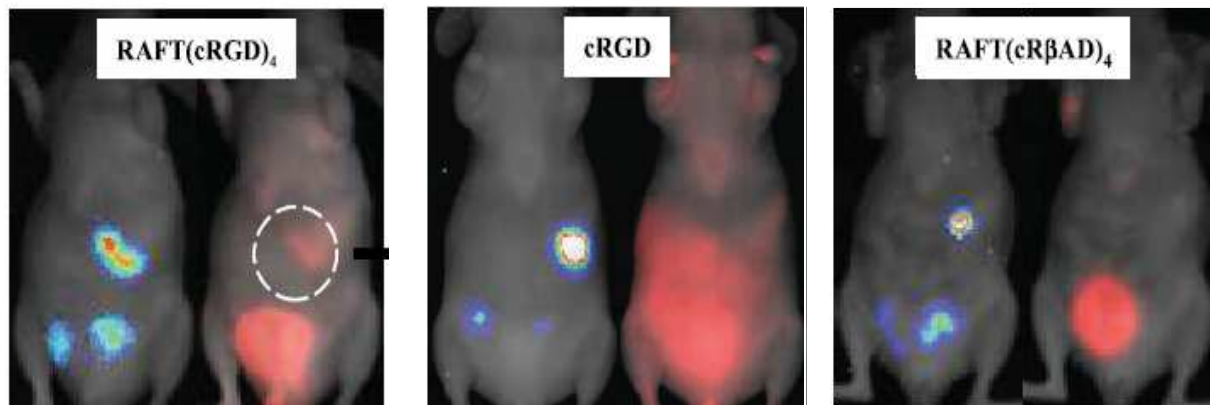
- The uniformity of the Luxiflux illumination has been tested at different distances of the objective. At 135mm, the uniformity is:
 - ⇒ +/- 10% in a 80mm diameter
 - ⇒ +/- 15% in a 100mm diameter
- For each wavelength, the optimal distance (of the objective) and the power of illumination have been determined:
 - ⇒ at 470nm, the Luxiflux gives from 2 to 12 $\mu\text{W}/\text{mm}^2$ at 135mm,
 - ⇒ at 633nm, it provides from 0,3 to 1,5 $\mu\text{W}/\text{mm}^2$ at 155mm.
- The Luxiflux has a serial interface which allows a control by Wasabi or Simple PCI. Using Wasabi, different parameters can now be controlled: the illumination intensity and the change of light (white light, blue and red).
- Future developments will include:
 - ⇒ a motorized iris and/or motorized lens
 - ⇒ different exchangeable modules, for other wavelengths
 - ⇒ (a potential possibility to get a motorized emission filter wheel)



The Luxiflux and its new controller

Results obtained using Luxiflux...

- Jean-Luc COLL (IAB Grenoble, FRANCE), who helped develop this technology (with Philippe RIZO's team of the CEA-LETI), has already published results obtained with Aequoria. He used, for complementary information and confirmation, both luminescence and fluorescence. Here are some of his results (article in press: Molecular Imaging)

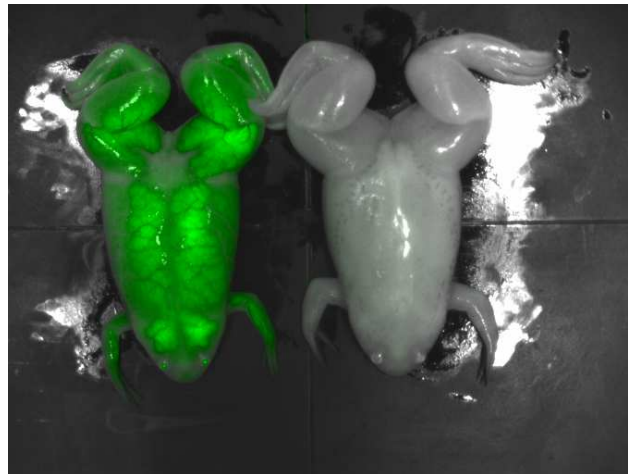


Combination of bioluminescent (left) and fluorescent imaging (right) of deep tumour metastases (no background subtraction) – pseudocolored and superimposed with a greyscale white light image. Luminescence images acquired during 5min. Exposure time for fluorescent images of 100ms.

⇒ To test whether this fluorescent agent (Cy5 labelled elements), combined with optical imaging could allow a non-invasive detection of deep ovarian metastases.

- Other tests on transgenic xenopes have been performed, during a demo, at University Paris-Sud (Orsay, FRANCE), thanks to N. POLLET.

Xenopus Laevis. Two albinos males, cmv-promoter/GFP for the left one, wild type for the right one. Superimposition of the fluorescent image (pseudocolored in green) and the greyscale white light image. Fluorescent images acquired during 100ms.



⇒ The GFP distribution can be well observed, thanks to the wide field of observation proposed by Aequoria and the uniformity of Luxiflux illumination

➡ The Luxiflux is an option that can be added on Aequoria. The best asset of this illumination system is the good uniformity it provides, contrary to fibres. This system is not often proposed, except by HAMAMATSU. The future developments planned are the opportunity to have one of the best excitation light source for macroscopic imaging on the market.

Specifications and appearance are subject to change without notice.

HAMAMATSU

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