LIGHT BULB LAB
INTERNAL REPORT N. 1/2019

LBL **1**, 1 (2019)

Physical properties of DIFA area: Food Observations

Light Bulb Lab[1]

[1] Department of Physics Astronomy – DIFA (Bologna)

Accepted 2019 February 20, Received 2019 January 9; Published 2019 February 28

ABSTRACT

We present the results from observations of the Navile DIFA area aimed at studying the need for food among students and researchers. The m-scale resolution allows us to resolve several subcomponents. The analysis of their spectra showed that the components have different spectral indices, suggesting that supply of fresh food is currently taking place in some regions of the DIFA area. Our model suggests that the injection is not enough for the survival of everyone. A fresh provision of nutrients may come from a subcomponent (the *canteen*) that is still unresolved. But it will not provide a significant contribution in the few years to come, increasing the probability for students to become relics.

Key words: radiation mechanisms: non-thermal – food – students: evolution, survival

1 INTRODUCTION

Since the early days when we were injected in the Navile headquarters, we started to lose a lot of energy. We did not offer any resistance, indeed the environment in which we are is flourishing and fulfilling. So, there must be another way to explain our energy losses. Back in the day, some rumours about an imminent opening of a canteen in the DIFA area were circulating. Most influential was the promise of an incoming Christmas celebration with *panettone* in this place. Later, the declaration has been disregarded in different respects. It was discovered that for many years to come we cannot rely on locally produced food.

Our team was the first to carry out tests to constrain the nutrition problem. We performed many 1h observations between 1PM and 2PM in the DIFA & CNR area in Bologna. Our aim is to estimate the net flux of food *versus* energy requirements of students and researchers. We model each spectrum with a power law. Then we introduce a moderate steepening and the effect of Self-Sufficient Alimentation (SSA). Assuming minimum energy consumptions we estimate the food required to maximize the lifetime of a person.

2 PHYSICAL PROPERTIES

In our model the *net flux of food* is described by a single power-law:

$$S_\nu \propto \nu^{-\alpha} \tag{1}$$

where ν quantifies the energy and nutrient requirements of a single person. The bigger the appetite, the faster the consumption of food. So, if no injection mechanisms are active, we expect to observe a cut off in the net flux of food at high-ν. In other words, hungrier students will cool off and die.

Food delivery companies may provide a continuous injection of power-law distributed food, this will cause only a moderate steepening rather than the cut off:

$$S_\nu \propto \nu^{-(\alpha+0.5)} \tag{2}$$

The steepening occurs at ν_b and its value decreases over time.

When nutrition expectations are very low (below ν_p), some students start to bring *self-produced* food with them. The resulting *net flux of food* will be zero at $\nu \ll \nu_p$ (fig. 1b). This is known as SSA (Self-Sufficient Alimentation).

3 OBSERVATIONS

The DIFA area and its net flux of food was observed for 1h between 1PM and 2PM. The m-scale resolution allows us to resolve several subcomponents (fig 2). Component A, whose counterpart is the CNR canteen, shows no signs of spectral ageing. Component B, whose counterpart is the entrance of DIFA building, shows a moderate steepening. Evidence of injection comes through via Gobetti jet thanks to food delivery couriers. This supply is however unsteady and insufficient to guarantee our survival. Components C, D and E are HFP (High Food *self*-Producers) candidates, given their very low flux of food at $\nu \ll \nu_p$. Component N cannot be resolved due to resolution limitation.

4 CONCLUSIONS

The analysis of the spectral indices across the whole structure showed that the subcomponents have a very different behaviour. The spectra are well explained mainly by energy losses of students because of the very low food production in the area (components B, C, D, E). Component A and HFPs will still live for a long time. Component B will soon cool off and become a relic. Some hope comes from component N. Nowadays it's not properly resolved. Within a few years we hope to be able to observe its contribution to the net flux of food.

We thank the referees for carefully reading the manuscript.

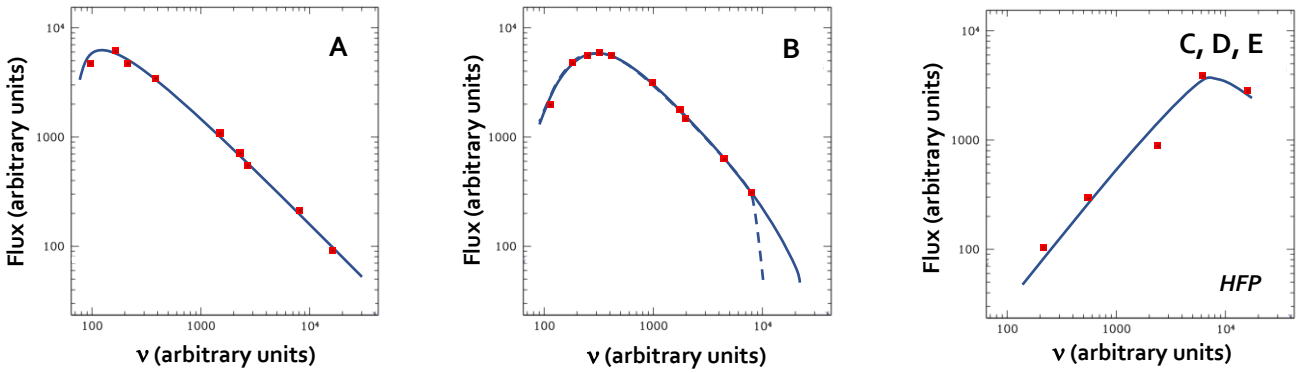

Figure 1. Net flux of food vs. nutrient requirements for different sub-components. [A] No spectral ageing with SSA (i.e. healthy and rich diet); [B] Moderate and insufficient injection from food delivery couriers, luckily no cut off is observed (*dashed line*); [C, D, E] High Food *self*-Producers candidates.

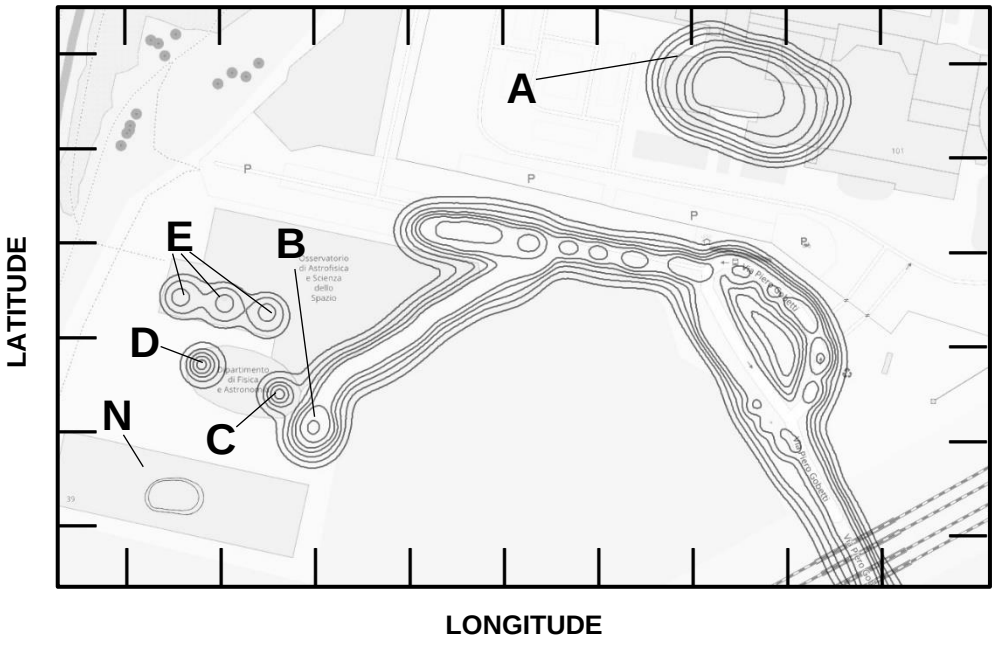

Figure 2. Map of the DIFA & CNR area in Bologna. The overlaid contours represent the net flux of food observed between 1PM and 2PM. Subcomponents are labelled and discussed in this article.