I.M.Panagiotopoulos School

Pallini

Neoclassical buildings of Athens

"The Greek Stones"

Proposal for "Beamline for Schools Competition 2019"

Introduction

Stathatos Mansion

Due to the rich history of the city of Athens, there is a vast collection of neoclassical buildings. Altogether, only 1,800 buildings have been recorded in the city of Athens while, according to recent surveys, the percentage of abandoned buildings is about 25%. An example of reference is the old palace where the Greek Parliament is housed nowadays. Moreover, the embassies of Britain, France, Italy and many others are housed in neoclassical buildings.

Greek Parliament

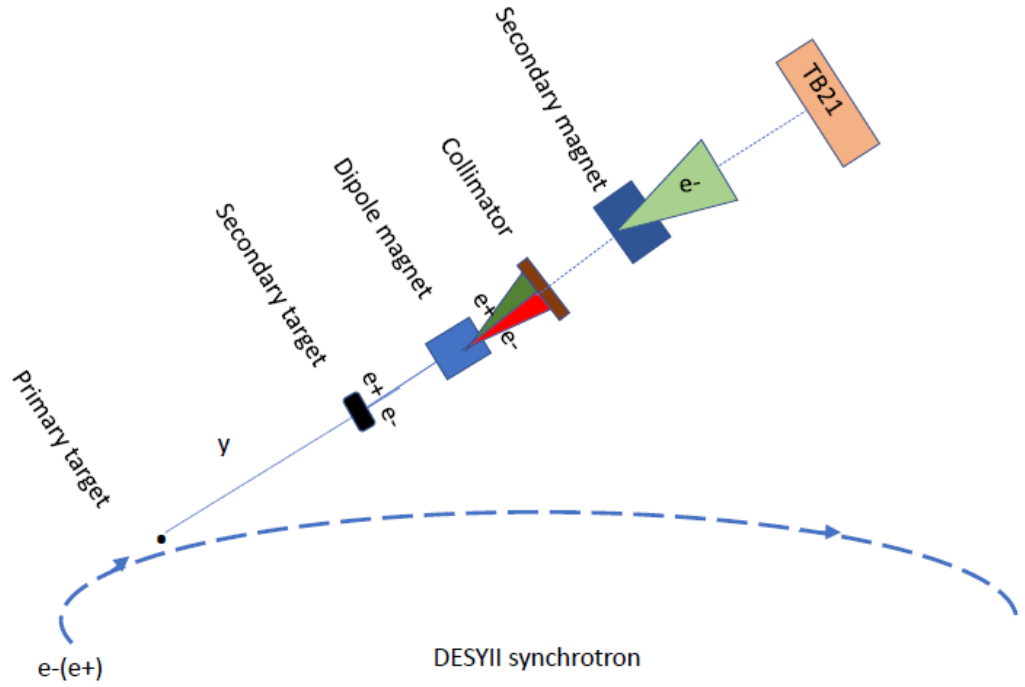
The recent collapse of two old buildings has brought to public attention the important issue of abandoned buildings in Athens. Despite being an important part of the country's cultural

heritage, these buildings remain unexploited mainly due to problems with statics or other technical issues. Finding more effective ways and methods of maintaining abandoned buildings has intrigued us since the beginning of the school year. Our aim is to contribute to the preservation of these cultural treasures of Greece for future generations. Our decision to achieve this goal is also supported by our interest in how physics is connected to architecture and history. Additionally, a possible visit to DESY facilities triggered our motivation to participate in the Beamline for Schools 2019 Competition.

Description of the experiment

The main aim of this experiment is to study the state of the mortar used in the construction of most neoclassical buildings in Athens. Firstly, electrons and positrons are accelerated to a high speed and thus collide with the first target. The positrons and electrons then turn into photons which collide with the second target and turn back into positrons and electrons.

This process is done in order to lower the electric charge of the particles and make it controllable. Afterwards, they pass through a dipole magnet that fluctuates between 0.5 and 6 GeV. Also, the positrons and electrons align, as they are affected by the magnet's vertical magnetic field. Then they pass through the Collimator, which detects the particles and controls their momentum, and thus their energy. By lowering their momentum we will manage to lower their amount of energy to 0,5Gev which is what we need for this experiment. Then, we will use a second magnet to separate the positrons from the electrons as a result of the opposing charges that they have. This way we will pull away the positrons and isolate the electrons which are necessary for the experiment.



Subsequently, the electrons pass through a magnet of controllable charge MRPC (Multi Gap Resistive Plate Chamber) which will be in place before and after the electron's passage through the TB21 and will calculate the changes in the amount of their energy (energy loss). In the TB21 we will place samples of the material used in the construction of the neoclassical buildings, which consists of Si, Ca, Al and H_2O. The experiment will be done on five different samples of the material i) in pristine condition, ii) in very good condition, iii) in good condition, iv) in mediocre condition, v) in bad condition. By completing this experiment, we believe that we will get data of the amount of energy missing from each of the samples, as well as the information we need in order to determine whether the data could be utilized. This way we may be able to propose that the Municipality of Athens take measures aiming at the preservation of the neoclassical buildings in question.

Discussion

We believe that our participation in this competition has helped us understand the applied sides of physics, its principles and laws in order to meet the challenge of the preservation of neoclassical buildings in Athens. Furthermore, on a personal level, our participation in the

competition has taught us how to learn, think and work together in order to achieve a common goal. At the same time, our interest in this subject has been developed as a result of the specific research work combined with our expectation of a possible visit to the DESY accelerator which will be a life experience.

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