An experimental set up for studying radiation phenomena from a flash X-ray discharge column is described. Studies of the discharge current as well as the X-radiation from the interelectrode space indicate that: 1. a pinch effect acts on the discharge column, 2. X-radiation is emitted from different parts along the column, and 3. the development degree of the pinch determines the column X-radiation intensity.

1. Introduction

The mechanism of the spark-triggered discharge in a three electrodes, high-vacuum flash X-ray tube is far from satisfactorily explained. The existing theories are based on studies of voltage and current as functions of time \(^1\) - \(^4\). Observed excavation of the anode surface has led to the assumption that evaporated anode material actively contributes to the high current that characterizes the later phase of the discharge \(^4\), \(^5\), but the steps in the creating of the metallic arc are still obscure. However, the radiation emitted from the discharge column might give valuable informations about the mechanism. Any investigations in this respect have not yet been reported. Therefore, the authors have recently started experiments to find the time-resolved intensity distribution of radiation in the X-ray, the ultraviolet and the optical regions emitted from the space between the flash tube electrodes. Although the experimental material still is fairly scanty we have found some effects concerning the X-radiation of such an interest that we want to report on them at this stage of the experiments.

2. Apparatus and Diagnostics

The present investigation was carried out with a flash X-ray system of a type described earlier by one of the authors \(^6\). However, changes

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have been made to allow studies of radiation phenomena in the discharge column. For that reason and for the sake of completeness the main details of the experimental equipment will be given here. Fig. 1 shows the discharge tube.

The anode and the cathode - 25 mm apart - are plane and made of tungsten and stainless steel, respectively. The tube has been provided