

## 15th Workshop on Breakdown Science and High Gradient Technology (HG2023)



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### Designing a PhotoCathode RF gun

*Tuesday, 17 October 2023 17:00 (2 hours)*

Nowadays, production of ultrashort and high-current electron bunches of few fs to hundred fs with several pc charge is a very attractive subject in the context of many recent applications, specially, in light sources, free electron lasers and plasma wake field accelerators. In the light sources and free electron lasers, the radiation gain is directly proportional to the beam pick current and so obtaining very short bunches on the order of fs plays an essential role for high gain machines.

Consequently, recent approaches for production of such electron bunches are based on usage of photo injectors in combination with a chain of bunch compressors. In the Iranian light source project attempts are directed toward the designing a novel compact soft X-ray synchrotron beyond the state of the art, using the latest advanced studies worldwide. The project will be started form a novel photoinjector which can provide very high quality, and in the meantime, ultra-short electron bunches in a compact structure. Moreover, finding the best structures for the rf components, specifically, the rf gun and its associated buncher cavity has a crucial effect on the function of the whole light source in near future. In this talk I will show some of the photocathode RF gun designing and compare the results

**Primary author:** HASHEMI, Seyedeh Sedigheh

**Presenter:** HASHEMI, Seyedeh Sedigheh

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