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## Conditioning methods to reduce ion-induced desorption

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Heavy ion accelerators suffer from pressure increases during operation, triggered by ion-induced desorption. Lost beam ions impinge on surfaces of the vacuum system and gas is released what in turn leads to more beam loss and further pressure increase. This pressure instability is called dynamic vacuum and limits the intensity of the ion beam. A common mitigation technique is the installation of dedicated catchers with minimal desorption yields to eliminate lost beam ions.

With the design and operation of next generation heavy ion accelerators, the problem recurs as these machines have such high intensities that beam loss rates will be similar to primary beam intensities of nowadays machines. To mention the most important, HIAF in China and FAIR in Germany will deliver  $10^{12}$  U ions per second. Spiral 2 in France will even deliver some  $10^{14}$  intermediate heavy ions per second that will be directed onto a production target. The amount of desorbed gas in the loss regions of these machines will limit a stable operation of the vacuum system and thereby of the whole machine.

We have investigated and compared conditioning methods to reduce the amount of desorbed gas in the respective areas. The methods are cleaning by the ion beam itself, the so-called beam scrubbing, sputter cleaning by means of a 5 keV Ar sputter gun and thermal annealing at different temperatures. Results will be presented and compared. After all, a reduction of the desorption yield by two orders of magnitude was demonstrated.

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