



## Advances in Atomic Gyroscopes: A View from Inertial Navigation Applications

JianCheng Fang  and Jie Qin \* 

Science and Technology on Inertial Laboratory, Beihang University, Beijing 100191, China

\* Author to whom correspondence should be addressed.

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### Abstract

With the rapid development of modern physics, atomic gyroscopes have been demonstrated in recent years. There are two types of atomic gyroscope. The Atomic Interferometer Gyroscope (AIG), which utilizes the atomic interferometer to sense rotation, is an ultra-high precision gyroscope; and the Atomic Spin Gyroscope (ASG), which utilizes atomic spin to sense rotation, features high precision, compact size and the possibility to make a chip-scale one. Recent developments in the atomic gyroscope field have created new ways to obtain high precision gyroscopes which were previously unavailable with mechanical or optical gyroscopes, but there are still lots of problems that need to be overcome to meet the requirements of inertial navigation systems. This paper reviews the basic principles of AIG and ASG, introduces the recent progress in this area, focusing on discussing their technical difficulties for inertial navigation applications, and suggests methods for developing high performance atomic gyroscopes in the near future.

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**Keywords:** atomic gyroscope; atomic interferometer; atomic spin; cold atom; guided atom; SERF; comagnetometer

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