

The equivariant cohomology rings of Peterson varieties in all Lie types

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Abstract. Let G be a complex semisimple linear algebraic group and let Pet be the associated **Peterson variety** in the flag variety G/B . The main theorem of this note gives an efficient presentation of the equivariant cohomology ring $H_S^*(Pet)$ of the Peterson variety as a quotient of a polynomial ring by an ideal J generated by quadratic polynomials, in the spirit of the Borel presentation of the cohomology of the flag variety. Here the group $S \cong \mathbb{C}^*$ is a certain subgroup of a maximal torus T of G . Our description of the ideal J uses the Cartan matrix and is uniform across Lie types. In our arguments we use the Monk formula and Giambelli formula for the equivariant cohomology rings of Peterson varieties for all Lie types, as obtained in the work of Drellich. Our result generalizes a previous theorem of Fukukawa-Harada-Masuda, which was only for Lie type A .