# Institut für Geometrie und Topologie

**Wintersemester 2022/2023**

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## Isoparametric foliations on projective spaces

**31. Januar 2023 – 16:15 Uhr**
**IGT-Seminarraum 7.530, Pfaffenwaldring 57**

Abstract: In this talk, I will report on recent joint work in progress with Miguel Domínguez-Vázquez, where we complete the classification of isoparametric foliations, or, equivalently, polar foliations on complex and quaternionic projective spaces.

It turns out that, for such a polar foliation, the pullback via the Hopf fibration is a polar foliation of the sphere. Thus the classification problem can be reduced - to a great extent - to the classification of polar foliations of the sphere, recently completed by Quo-Shin Chi.

However, the classification on the sphere does not readily translate into a classification on the complex and quaternionic projective spaces, because the following interesting phenomenon arises. For a given polar foliation of the sphere, there might be several compatible complex or quaternionic structures, which project to incongruent foliations. Moreover, homogeneous foliations sometimes project to inhomogeneous ones.

In two recent articles, by Domínguez-Vázquez in 2016 and by Domínguez-Vázquez and Gorodski in 2018, the classifications of polar foliations on complex, resp. quaternionic, projective spaces were given with the exception of foliations whose pullback is an isoparametric hypersurface of the 31-dimensional sphere with multiplicities 7 and 8, where their method could not be applied.

Curiously enough, when those two papers were written, the classification of polar foliations of the sphere was not yet finished and the last outstanding case, which was recently completed by Chi, is also about hypersurfaces of the 31-dimensional sphere with multiplicities 7 and 8. But it is not clear how these two facts are related, if at all.

I will first talk about the history of isoparametric hypersurfaces, then shortly mention some generalizations and related problems. In the last part, I will speak about the automorphism groups of isoparametric foliations in the 31-dimensional sphere.

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