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**WILLIAM MARTIN**, Worcester Polytechnic Institute

*The design strength of  $P$ - and  $Q$ -polynomial association schemes*

Let  $\Gamma$  be a  $Q$ -polynomial distance-regular graph on vertex set  $X$  and let  $E_0, E_1, \dots, E_d$  be a  $Q$ -polynomial ordering of the primitive idempotents of its Bose-Mesner algebra. If  $E_1$  has rank  $m$ , then  $\frac{|X|}{x} E_1$  is the Gram matrix of a spherical code in  $\mathbb{R}^m$  and this is a spherical  $t$ -design for some  $t \geq 2$ . In this talk, we investigate the relationship between  $t$  and the Krein parameters of the association scheme. In particular, we prove that, for  $m > 2$ , we have  $t \leq 5$ . This resolves a conjecture I made in 2013. This is work in progress with Jesse Lansdown (Galway), Akihiro Munemasa (Tohoku), Sho Suda (NDA Japan) and Hajime Tanaka (Tohoku).