Maximum hittings by maximal left-compressed intersecting families

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(This talk is based on joint work with R. Mycroft.)

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The celebrated Erdős-Ko-Rado Theorem states that for all integers $r \leq n/2$ and every family $\mathcal{A} \subseteq [n]^{(r)}$, if $\mathcal{A}$ is intersecting (meaning that no pair of members of $\mathcal{A}$ are disjoint), then $|\mathcal{A}| \leq \binom{n-1}{r-1}$. For $r < n/2$, the star is the unique family to achieve equality. In this talk we consider the following variant, asked by Barber: for integers r and n, where n is sufficiently large, and for a set $X \subseteq [n]$, what are the maximal left-compressed intersecting families $\mathcal{A} \subseteq [n]^{(r)}$ which achieve maximum hitting with X (i.e. have the most members which intersect X)? We answer the question for every X, extending previous results by Borg and Barber which characterise those sets X for which maximum hitting is achieved by the star. This is joint work with Richard Mycroft.