Explicit and uniform estimates for second order divergence operators on $L^p$ spaces

It is the aim of the talk to give – aside the Beurling/Deny approach – a consistent definition of second order divergence operators on $L^p$ spaces, even if the underlying domain is highly non-smooth, the boundary conditions are mixed and the coefficient function is real, bounded and elliptic – but not necessarily symmetric. In order to do this, one first proves that, under minimal assumptions, the $L^2$ resolvent transports the spaces $L^p$ with sufficiently large $p$ into $L^\infty$. This shows that, for these $p$, the part of the $L^2$ operator in $L^p$ possesses a domain which embeds into $L^\infty$. Having this at hand, one can modify ideas of Cialdea/Maz'ya to include the numerical range in a certain sector. This leads to suitable resolvent estimates. Moreover, we prove that the resulting semigroup is contractive and analytic with explicitly determined holomorphy angle. Finally, a holomorphic calculus is established with (half) angle smaller than $\pi / 2$. This gives even maximal parabolic regularity via the Dore/Venni theorem.